MAY 1941 VOL. 13 NO. 5

FOOD INDUSTRIES

M. A. WILLIAMSON
Publisher

LAURENCE V. BURTON
Editor

E. S. STATELER
Associate Editor, Chicago

G. L. MONTGOMERY
Associate Editor

IVAN C. MILLER
Distribution Editor

F. K. LAWLER
Managing Editor

R. S. McBRIDE, Washington, D. C.
PAUL WOOTEN, Washington, D. C.
N. A. BOWERS, San Francisco, Cal.
S. T. HENRY, Spruce Pine, N. C.
EARLE MAULDIN, Atlanta, Ga.
ARTHUR S. ALLEN, Consulting Color Editor

FOOD TECHNOLOGY

Food Technology
Activated Bauxite—New Color Adsorbent 115

Baking and Milling
Wheat "Peeling" Process Yields High-Vitamin Flour and Bread..... 70

Beverages
Coffee Preserved by Freezing..... 79
Effect of Head Space in Bottled Wines 115

Canned Foods
Canning Tomato Juice..... 115
Canned Fruit Juices..... 115

Dairy Products
Frozen Cream 116
Bitter Flavor in Milk and Cream.... 116
Fat Content of Cream Cheese..... 116
Bacteriophage — Trouble Maker in Cheese Manufacture 117

Vitamins
Vitamin B_1 Content of Flour..... 117

Meats
Plant Without Laboratory Hires Chemist Without Experience..... 67
Why Zero Deg. F. Is Best For Pork in Frozen Storage..... 118

Miscellaneous
How Toxic is Arsenate of Lead?..... 118
Olive Products 119
Making Acids by Fermenting Glucose. 119
Possibilities of Gossypol Production.. 119
Something New in Potatoes..... 119
Selenium in Soils and Foods..... 120
Rat Lures 120

Preserving
How the British Make Jams..... 74

Special Feature

Plant Without Laboratory Hires Chemist Without Experience 67
By The Greenhorn Chemist

Management

U. S. Inspection and Grading—A New Factor in the Food Industries 35
First User of AMS Tells Why 37
By A. J. Rogers
"If This Be Treason, Make The Most of It" 39
By Paul Stanton
Manufacturers' Brands Benefit from AMS Shield on Labels 43
AMS Inspection Means More Sales at a Profit ... 47
By Perry Myers, as told to Ivan C. Miller
Takes AMS Inspection in Stride 52
By Charles F. Berry
What's Behind U.S. Inspection and What It Involves 54
By Ivan C. Miller
AMS Reports on Progress 66
Letter from Paul M. Williams
Building Men for Progress 77
By Samuel J. Martinez
Refrigerated Trucks Find New Use 84

Quality Control

Wheat "Peeling" Process Yields High-Vitamin Flour and Bread 70
Coffee Preserved by Freezing 79

Production

How the British Make Jams—Part I 74
By H. B. Cronshaw
Progress in Processing Salt Stock—Part III 86
By W. G. Wormley

Engineering

Boiler Water Conditioning Avoids Trouble and Expense—Part I 72
By Robert A. Clarke
How to Measure Bulk Quantities of Liquids—Part II 80
By Neal M. Carter

Every Month

Talk of the Industry... 31
New Packages, Products 83
Hints and Hurdles.... 87
Automotive 84
The Food Industry News 89
Business Trends 98
Men, Jobs, Companies.. 101
Food Equipment News 104
Catalogs 111
Food Technology 115
Letter to the Editor.... 121
Books 122
Patents 123
Formulas 125

★HOMES OF FAMOUS FOODS

On the cover is the factory of Burnham & Morrill Co., Portland, Me. The company packs vegetables, brown bread, mince meat, spaghetti and seafoods. It has a branch in Nova Scotia, one in New Hampshire and several in Maine. Its brands are B & M, Paris, Red Jacket, Seasweet, Oxford.

McGraw-Hill Publishing Company, Inc., James H. McGraw, Founder and Honorary Chairman. Publication Office: 99-129 North Broadway, Albany, N. Y., Editorial and Executive Offices: 330 West 42nd Street, New York. Branch Offices: 520 North Michigan Ave., Chicago; 68 Post St., San Francisco; Aldwych House, Aldwych, London, W.C. 2; Washington; Philadelphia; Cleveland; Detroit; St. Louis; Boston; Atlanta, Ga. James H. McGraw, Jr., President; Howard Ehrlich, Executive Vice-President; Mason Britton, Vice-Chairman; B. R. Putnam, Treasurer; D. C. McGraw, Secretary; J. E. Blackburn, Jr., Director of Circulation.

Published monthly; price 35c a copy. Allow at least ten days for a change of address. All communications about subscriptions should be addressed to the Director of Circulation, 330 West 42nd Street, New York, N. Y. Subscription rates: United States and possessions, Mexico, Central and South American countries, $3 a year, $4 for two years, $5 for three years. Canada, $3.50 a year; $5 for two years; $6 for three years (payable in Canadian or U. S. funds). Great Britain and British possessions, 30 shillings for one year, 60 shillings for three years. All other countries, $5 a year, $10 for three years. Entered as second-class matter Aug. 17, 1936, at Post Office, Albany, N. Y., under the act of March 3, 1879. Cable address: "McGrawhill, N. Y." Member of A.B.P. Member of A.B.C. Contents indexed monthly in the Industrial Arts Index. Copyright, 1941, by McGraw-Hill Publishing Company, Inc.

A McGRAW-HILL PUBLICATION

This Issue

WHOLE STORY ON U.S. GRADING

It would be difficult to exaggerate the possible significance of the rapidly growing continuous Federal inspection. For here is a vital new force in applied food technology and management that reaches all the way from the raw material to the label on the can and to the reaction of the consumer.

But you don't have to take our word for it. Turn to the special section starting on page 35 and read what the canners using the AMS service have to say about it. Then read the article by our distribution editor, Ivan C. Miller. He visited plants under AMS inspection, and he got the thinking of canners not using the service but who are competing with those that are. Then there is a letter by Paul Williams, AMS's man in charge of the federal inspection.

From this material you will learn not only what it's all about—what AMS requires in the plant, cost of the service, previous experience of food industries under federal inspection, and buyers' and consumers' reactions—but you can judge what may lie ahead.

HOLD THAT SNEER

You may be tempted to sneer when you turn to page 67 and read this headline: "Plant Without Laboratory Hires Chemist Without Experience." But to sneer would be to do an injustice. For the greenhorn chemist made good in a big way—improving products, cutting costs, and what have you. But he succeeded by the grace of an employer who knows what a chemist is for—which is quite a story in itself.

BY AN ENGLISH AUTHORITY

Dr. H. B. Cronshaw, an Englishman who speaks with authority on British food manufacturing practices and principles, starts an article on jam manufacturing on page 74. As you would expect if you knew Dr. Cronshaw, the article is thorough in its treatment of the subject, from the practical as well as the theoretical viewpoint. And it outlines advanced practices that should be studied by American manufacturers.

TREAT BOILER WATER RIGHT

If untreated water is used in the plant boilers, it may cause trouble. Scale may collect in the boiler tubes and drums. Minerals may concentrate in the boiler water. These conditions reduce the boiler efficiency and may cause scale and mineralized water to be carried over into the process and equipment, or even into the product. What can be done to avoid these conditions is told on page 72 by Robert A. Clarke, research director of Acme Breweries.

Coming

CONTROL YOUR VITAMINS

What with all the big guns of nutrition thundering on every side, the food manufacturer is in a confusing situation. What to enrich? When to enrich? How much to enrich? How to enrich? How to control enrichment?

To many of these questions, we can offer no answer. They are matters for the scientist, the physician and government regulatory bodies to determine. But once the food experts decide to what foods vitamins are to be added, and in what quantity, the food technologist comes into the picture.

Already, much experience is available on how to add vitamins in order to get the desired amount into the finished product as it reaches the consumer. Also, much experience is available as to how to check on the results obtained, so that the operation may be uniformly controlled and so that each unit of product will always come up to the standard sought.

This information is available, but today it is scattered—some here, some there—and much of it only in the records and minds of those who have carried out the work. So, in order to make it widely available, FOOD INDUSTRIES is bringing as much as possible together in one place—its June issue. This will be authoritative material, written by men who learned by experience the factory methods and laboratory technics involved. It will be something that you will want to save. If you don't need it now, it is likely that you will have use for it soon.

COULD BE DONE COMMERCIALLY

Experimental tests with continuous "flash" pasteurization of tomato juice indicate that the process could be employed commercially with success. In the tests, conducted by the research department of American Can Co., heat-resistant spoilage spores in the juice were killed by passing the product through a tubular heat exchanger. Details will be given by D. J. Wessel and H. A. Benjamin in an early issue.

NEW LIGHT ON OLD PRODUCT

Cranberry sauce is as old as Thanksgiving, but new is the information on its technology to be revealed in an article by G. L. Baker and W. M. Goodwin, Delaware Agricultural Experiment Station. Research indicates that the inversion of sugar deserves no consideration in cranberry sauce manufacture. But if strength and low syneresis values are to be maintained in cranberry sauce jellies, every consideration should be given to the prevention of hydrolysis of the pectin. But the authors will tell all about it, and they'll go a step further in a later article and show how it is possible to make jelly without evaporating.

FOOD INDUSTRIES

Established 1928 — McGraw-Hill Publishing Company, Inc.

LAURENCE V. BURTON, Editor

Volume 13, Number 5 MAY 1941

The Talk of the Industry

★ PERHAPS "Colonel" Charles A. Lindbergh's morale would be improved by some vitamins of the B complex.

★ C. A. SOUTHWICK of General Foods has sent us a page from *Punch* devoted to the subject of Research. It starts out this way:

"It is not absolutely necessary to have a research department—at least, not one of your own. In fact, probably the most efficient and economical type of research department is to have an employee whom you really can *trust* working in the research department of your principal competitor."

Want any more?

★ NOW IS THE TIME to be forehanded. From what several equipment builders have told us in the past few weeks, it is imperative that you place your orders at as early a date as possible. One builder is still able to make prompt shipments solely because he doubled his normal inventory of steel a year ago. But when this supply has been used, a buyer will be disappointed as to delivery dates unless, perchance, he can get a high priority rating.

Another concern is choked with orders from the chemical process industry, and food manufacturers' orders will have to be fitted in wherever possible. Prompt shipments are not possible there for some time. The situation here is not yet acute but the time element is definitely extending.

Only by anticipating one's needs by several months will it be possible to avoid disappointment on deliveries. Furthermore, the picture is changing so rapidly that what may appear to be an easy procurement problem today can become extremely difficult in a month.

★ A VERY significant trend is the thoughtful long range view being taken by many industrial executives in fields outside the food industry. Food is food for man whether he be in civil or military life, but munitions of war have almost no use at all in civil life. Manufacturers, who today are overwhelmed with munitions contracts, are much concerned over what they will be producing after the emergency is over. And generally their present long range policies stem from the principle that a strong nation is one which has a strong economy.

To strengthen our domestic economy is their chief aim, and their industrial research departments are working hard to develop new things that will be in demand three or four years hence. If enough of these new creations are developed, there need be no post-emergency slump.

★ TO RELIEVE the monotony of tragic news, a friend directs attention to Factors Involved in the Ejection of Milk, *Journal of Dairy Science* **24**, 211, 1941. On page 215, in discussing the effect of fright on the ejection of milk, the authors say:

"Accordingly, (cow) E307 was systematically frightened as the mechanical milker was attached. Frightening at first consisted in placing a cat on the cow's back and exploding paper bags every ten seconds for two minutes. Later the cat was dispensed with as unnecessary."

So boss! Who says scientific research is a puttering job?

★ FOOD PRICES are slowly going up, but not to figures that arouse much interest. It has been some time since the high cost of living has made the front page, or even the inside pages of the newspapers. Dollar volume in foods at retail is reported to be up only 12 percent above 1940, according to the American Institute of Food Distribution, but two-thirds of this is due to increased consumer purchases and one-third due to higher prices. But preparations for increased production of seasonal items is going ahead at a rate that is amazing. The U. S. is really getting ready to feed Britain without delay.

★ IT BEGINS TO LOOK like old times now that soldiers wearing the RTO brassard can be seen in the larger railroad stations.

★ A VERY SIGNIFICANT REQUEST has been placed before appropriate committees of Congress. Its significance is so high that one is not surprised that certain individuals in the field of food distribution have suffered attacks of high jitters. This request was from Thurman Arnold for a whacking sum to finance an investigation of the distribution trade to see if there has been any collusive refusal to purchase government (AMS) inspected canned foods.

There is also a rumor of a comparable

request for a special appropriation for the Food and Drug Administration to investigate the possibility of misbranding of certain foods bearing grade labels which, according to report, do not always reflect the true quality of contents. This covers noninspected A, B and C, also Fancy, Choice and Standard grade designations.

Proposed Definition Of Enriched Flour

NO OFFICIAL DOCUMENT has been more eagerly awaited in recent years than the proposed regulations for and definitions of various products made by grinding wheat. These were published in the *Federal Register* on April 1, 1941. Greatest interest has centered around the proposed regulations covering enriched flour which, if finally approved and made official, will require the following enrichments per pound of flour:

1. Vitamin B_1 (Thiamine) ..1.66 mg. to 2.5 mg.
   Vitamin B_2 (Riboflavin) ..1.2 mg. to 1.8 mg.
   Nicotinic acid or nicotinic acid amide ....6 mg. to 9 mg.
   Iron (Fe) .....6 mg. to 24 mg.

2. Vitamin D may be added in such quantity that each pound of the finished enriched flour contains not less than 250 U.S.P. units and not more than 1000 U.S.P. units of Vitamin D.

3. Calcium may be added in such quantity that each pound of the finished enriched flour contains not less than 500 and not more than 2000 milligrams of Calcium (Ca), except that it may be acidified with monocalcium phosphate irrespective of the minimum limit for calcium herein prescribed.

4. It may contain not more than 5 per cent by weight of wheat germ or partly defatted wheat germ.

5. In determining whether the ash content complies with the requirements of this regulation allowance is made for any added minerals.

From these proposed regulations for enrichment the language makes it clear that, if a flour is to be enriched, it is *mandatory* to put in the three vitamins of the B complex and iron, but that it is *optional* to add calcium, Vitamin D or wheat germ.

Dr. Russell M. Wilder's pronouncement of January 29, 1941, on the other hand, said: "'Enriched flour' will contain thiamin, nicotinic acid and iron in amounts corresponding to or even greater than those in stone-ground flour from high vitamin quality wheat."

It will be observed that riboflavin is required if there is to be any enrichment, which was something of a surprise when the proposed definitions and standards appeared. And it came as a jolt, too, because the cost of enrichment will be more than was calculated under Dr. Wilder's advice, for he had omitted the riboflavin.

The proposed standards do not impose the manner of addition of the enriching materials; they merely state the amounts that must be there if enriched flour is to be labeled correctly.

There is no provision for enrichment of whole wheat flour, and in this connection it is interesting to read item 39 in the Proposed Findings of Fact, *Federal Register*, April 1, 1941:

"Essential food elements, now present only in insufficient quantities in many diets, which are present in wheat in considerable quantity, are the vitamins of the B complex and compounds of iron. At the present-time the following vitamins of the B complex are available for the enrichment of flour, either in the form of synthetic products or secured from wheat by slight changes in the process of milling flour: Vitamin B_1, riboflavin, nicotinic acid or nicotinic acid amide."

This means that, if these proposed findings become final, the policy is to stick to the amounts naturally occurring in whole wheat.

According to the announcement, interested parties were given until April 20 to file exceptions to the Proposed Findings of Fact or the Proposed Definitions and Standards of Identity. (At the time of writing it was our understanding that an effort was being made to effect a transfer of one of the factors from the required to the optional group,

Hors d'Oeuvres

★ Vanillin, says a financial writer, can be produced from clove oil. We'd like to make him a little bet on that.

★ *The availability of beer at Army camps is being commended as an influence for keeping the soldier's morale on a high plane. If hard liquor were available, morale would still be on a high plane but the soldier might be level with the curb.*

★ Want to know what is a sure-fire reducing diet? Eat the holes in doughnuts.

★ *Gay colored flour sacks with fancy flowered designs are used by General Mills for "Sunbonnet Sue" flour. From these sacks thrifty homemakers can make wash dresses. Pity the poor grocer when a customer says, "Gimme a size 40 blue dotted Swiss sack of Sunbonnet Sue, and make it snappy."*

★ "Meat" is being produced in Hungary from 12 garden plants. It is in powdered form and is prepared for use by adding water, salt and bread.—Much simpler than raising a hog and butchering it.

★ *A new industry in the Gulf states makes costume jewelry for women from scales of the tarpon, gar and drumfish. Men have long made lures for fish, now the fish are supplying lures for men.*

★ People laughed at W. K. Kellogg's idea of manufacturing a precooked, ready-to-eat breakfast food. Women, they said, will never consent to give their families a "boughten" dish. That was in 1898. Today the Kellogg factories have a floor space of 25 acres.

★ *Pepsi-Cola has issued a little recipe booklet with some amazing gustatory get-ups in it. There's baked ham made with Pepsi-Cola, milk mixed with Pepsi-Cola, ice cream mixed with Pepsi-Cola and, the prize dish, broiled grapefruit made with Pepsi-Cola. They ought to have a new slogan: "Pepsi-Cola Hits the Spot, Put It Into Every Pot."*

★ Cooked potatoes add considerable vitamin C to the diet, baked, steamed or boiled. Sounds like spinach but its a USDA fact.

★ *The R.A.F. last month dropped 15,000 packages of tea over the Netherlands, each package carrying the label: "Netherlands will rise again." The British ought to offer a premium for every Boche top sent in.*

★ Tibetan monasteries mold idols of their favorite gods from butter for the Winter Butter Festival. Monkery a la Wisconsin.

★ *Major Quisling, who gave Norway to the Nazis, is said to have decreed that his picture be placed on Norwegian sardine tins. You might call it descriptive labeling.*

★ Since repeal, beer has benefited the economics of the country by thirteen billion dollars worth. Which makes beer almost as good as a first-rate war.

★ *Wrigley recently wired OPM that its inventory of 500,000 lb. of aluminum, intended for gum wrappers, would be made available for defense. That's enough aluminum for 996 airplane wings. Which will give the Nazis something to chew on.*

F. K. L.

on account of the cost of that food factor at the present time.) Procedure from there on is to give consideration to the exceptions, then promulgate the official order. And, according to the law, there shall be a period of 90 days between publication of the final order and its becoming effective. Which means that it cannot become effective until some time after July 20, 1941.

No Confusion About Enrichment?

FROM COAST TO COAST have come protests or joshings that there is much less confusion about vitamin enrichment than was stated to be the case in the March issue of FOOD INDUSTRIES. Also numerous expressions of marked approval of our viewpoint and the opinions of authors have been received. Reader opinions, whether bouquets or brickbats, banter or serious, are always welcome.

So there is no confusion? All right, what about these?

During the month of March, one of the internationally famous chemists who specialize in nutrition was lecturing on vitamins and the enrichment program to his students at an outstanding university. He told them that enrichment was now (in March!) "the law of the land," and cited the January 29 recommendations of the Committee on Food and Nutrition of the National Research Council. Evidently he was slightly unaware of the function of the National Research Council and of the procedure in establishing food standards under the Food, Drug and Cosmetic Act.

Another case arises in a printed bulletin put out by a friend who genially took us to task. In this document, printed some time before the April 1 announcement about flours in the *Federal Register*, are found these words:

" 'Enriched bread' may be white bread, slightly darker bread made from special process flour, milk bread, or raisin bread, which contains in addition to the usual ingredients proper amounts of (1) thiamine (vitamin B_1), (2) nicotinic acid (the pellagra-preventing vitamin), and (3) iron. These are required ingredients."

Yet even the *proposed* standards for enriched bread had not been promulgated.

And then there is Dr. Russell M. Wilder, chairman of the Committee on Food and Nutrition of the National Research Council, who told the world on January 29 to go ahead on enrichment, and assured it that the enriching agents would be thiamine, iron and the pellagra-preventing factor, nicotinic acid.

On April 1 the Food and Drug Administration put out the first officially proposed standard for enriched bread that included also riboflavin or vitamin B_2—an ingredient that Dr. Russell's committee failed to specify in the original enthusiastic pronouncement.

There can be no doubt that there is much misunderstanding—which we have termed confusion. The confusion is not so much about the function of vitamins in nutrition as about the legal aspects of vitamin enrichment, and the procedure in defining the standard for enriched flour or enriched baked goods, notably bread. Also there is confusion about the moral responsibility for the production of flour that has less of the vitamins than the original wheat.

With one exception, every person who has taken issue with FOOD INDUSTRIES about confusion has supplied ample evidence to prove that he, too, was confused and did not realize it.

So much for confusion.

Food Buying Estimates

ESTIMATES of the prospective purchase of food by the government range from as low as 1 percent to as high as 30 percent. This wide spread would seem absurd if it all related to the same thing. It does not.

Perhaps the only reliable current estimate of government food buying in the United States relates to the composite total. For if Uncle Sam is to feed two million persons in the Army, Navy, hospitals, and so forth, he must buy 2 to 3 percent of the marketed food of the country for this purpose alone. If we assume that we are going to aid others, especially Britain, perhaps that would mean 2 to 3 percent more. Hence an estimate that the total of government buying will reach 4 to 5 percent of the total food marketed would seem to be reasonable.

But such a figure means little or nothing to the individual food enterprise. It says nothing of the distribution of purchasing over sugar, fats, cheese and other wanted products. It takes no account of the relationship of the buying to the supply for any individual item. Actually, many items will not be purchased at all, or in negligible quantity. Buying of other items may reach 25 or 30 percent of the gross sales. All these possibilities must be taken into account when the production executive undertakes any scheduling of business for the next season. He must try to find out whether his kind of product is going to be in demand by the government. And then he must find out whether the buying policies which now are only in the development stage will enable him to get a share of the government business. He may even need to figure out whether he may be compelled to take some of the government business whether he wants it or not.

All this complication gives little comfort to the individual production executive. But these are not comfortable times for anyone. All of us are beginning to feel the disturbance of normal ways. Nevertheless, it will be up to each of us to plan as best he can, even though plans may have to be radically changed from time to time.

Many Getting Aboard The AMS Band Wagon

THIS MONTH has seemed an appropriate time to present a study of the impact on the food industry of the continuous inspection and grading activity of the Agricultural Marketing Service. While only four concerns were under such inspection in 1940, it is known that the number will be at least 17 in 1941, and that a further huge number of canners have asked for the service but will be denied it in 1941 for one reason or another.

If a plant is to be acceptable for continuous inspection it must comply with many stringent requirements. The purpose of this study has been to ascertain what compliance actually involves in the way of facilities, equipment and discipline. Some have erroneously believed that its purpose was to make unfavorable comparisons. That is not true. It is solely a fact-finding survey to permit the remainder of the industry to ascertain what this new factor in production and distribution will mean to them as well as its costs and benefits.

FOOD INDUSTRIES is merely reporting the facts. From what we have learned, however, it looks as if as many canners will get aboard the band wagon as it will carry.

Any who desire to debate the pros and cons of AMS work in these pages should get their copy to us by May 26 for publication in the July issue.

Transport Bottlenecks

SOME OF THE FOOD INDUSTRIES are going to find that new transportation agencies will be needed before the emergency period is over. It is not too soon to do a bit of planning now.

Railroad transportation is not going to break down as it did in the first World War. But railroads are going to be overloaded.

One should remember that defense goods are going to have priority if a

shortage of freight cars or motive power should develop. A food enterprise which ties in with defense activities, or makes products largely for military use, can count on getting plenty of high priority transportation supply, even if the railroads are having serious difficulties.

Most important, however, is the fact that transportation prices are fixed by Interstate Commerce Commission rulings; but fixed prices do not render service if the physical facilities for service should be inadequate. Placing too great confidence on assurances that rail service will always be available may prove dangerous. The urge to shift to trucks will not come from rate changes, but from the inadequacy of service facilities.

There is no time like the present to study this situation and determine what alternative transport facilities are available, their probable cost and their suitability. When the time for decision comes it will be easier to plan wisely if these facts are known well in advance.

Use Your State Experiment Station—You Support It

FROM THE endless stream of inquiries that come to our desk, it is apparent that very few persons in the food industry are aware of the existence of the agricultural experiment stations in their respective states, let alone what these stations could do for them or the interesting fact they are helping to support the stations by their own taxes.

Some of the ablest food technologists in the United States are to be found in state universities and agricultural experiment stations. These men are employed to assist agriculture in their states; and what better way is there to assist agriculture than by making it easier to sell the products of the farm!

We strongly feel that food manufacturers should get acquainted with their own experiment stations and realize the high caliber of men who, under proper circumstances, may be called on to advise or to help solve many a problem. When the solution of a problem is of specific value only to a single manufacturer for his own selfish gain, the experiment station is, of course, not available, for it is a public institution. But where the problem is one that faces many a concern, or in particular is a problem the solution of which will also be of benefit to many farmers and the public at large, then the state agricultural experiment station of your own state should be consulted.

FOOD INDUSTRIES is of the opinion that a close liaison between the station and all food industries of any state is highly desirable.

I. F. T., It's Pittsburgh, June 16-18

A CONVENTION that all who are active in the food industry should attend is that of the Institute of Food Technologists in Pittsburgh, June 16 to 18. Meetings will be held in the William Penn Hotel.

Here is the gathering place of men from all branches of the industry, men whose jobs are production, quality control, research, development, engineering; also men from universities and agricultural experiment stations whose chief interests are food technology and research; and men from Federal and state food control offices.

Employers should send as many of their men as possible to this meeting. It will be a sound investment in employee training. And it should not be overlooked that the ominous signs of the times indicate an approaching need for pooling all our technical resources in food preservation and production. To get acquainted is the first step in organization.

The final program will be printed in our June issue.

A Job for the Institute of Food Technologists

AT A RECENT MEETING of a group of members of the Institute of Food Technologists with the New York Section of the American Association of Cereal Chemists, Prof. H. J. Masson of New York University urged that the IFT should take the lead in shaping up the curricula of courses in food technology in the various colleges and universities in the United States. His point was that the technologists in the food industry should specify the nature of the training that the student should receive if he is to be of maximum benefit to the industry which may be expected to employ him rather than to remain silent while the college and university faculties are wrestling with the problem of what training a food technologist ought to receive.

In view of Professor Masson's long experience in the American Institute of Chemical Engineers, which has played a primary role in elevating both chemical engineering education and the profession to its recent high degree of excellence, his advice is well worth heeding. His development of the graduate course in food engineering at N.Y.U., his experience in the field of process engineering, plus a long period of observation of the industrial careers of his students in chemical engineering lend authority to his advice.

Several universities which expect to offer new courses in food technology are today facing the complex problem of decision as to what subjects may be safely omitted from a curriculum and what must be included. One of the principal difficulties lies in the fact that a food technologist has an awful lot to learn, perhaps more than he can absorb in four years of intensive training. Some schools are leaning toward a five- or six-year course. Others tend to emphasize the "practical" aspects of food technology and are attempting to create a course of instruction that appears to be an injudicious blend of trade school training with true university training in fundamental sciences and engineering. Still others place major emphasis on special branches of science without creating the integrated whole that is desirable.

Plainly a real problem exists which will require a conference of many minds to find a solution. If the Institute of Food Technologists can assume the leadership in shaping the future course of education in the field, many wasted years may be avoided, and it may also be possible to obviate a repetition of the errors of chemical engineering education that some institutions perpetrated not many years ago.

New Way To "Decorticate" Wheat

FOR NICE TIMING, nothing could be more appropriate than the recent announcement of Mr. Theodore Earle about his new method of skinning the wheat berry by means of a flotation agent. It ties in very well with the whole enrichment program. His invention is described elsewhere in this issue. By appropriating the unit operations of mining and metallurgy his discovery has made it possible to remove the outer skin from wheat without losing any of the endosperm from which flour is made.

At first blush it would appear that his discovery may have far reaching effects on flour milling technology as well as its economics. Primarily it would appear possible to produce a nearly 100 percent whole-wheat flour that would have little rough bran in it. And from the nutritional viewpoint such a flour would have much interest.

Secondarily, it would seem that the economic results from the Earle invention would be very important if the process is generally adopted. Obviously, such a "decortication" of wheat is bound to result in certain changes in the amount and character of the byproducts of flour milling. Whether this is to improve or detract from the slim profits of the millers and feed manufacturers will be awaited with great expectancy.

U.S. INSPECTION And GRADING

...A New Factor in the Food Industries

First User of AMS Tells Why 37

"If This Be Treason, Make the Most of It" 39

Manufacturers' Brands Benefit From AMS Shield on Labels 43

AMS Inspection Means More Sales at a Profit . . . 47

Takes AMS Inspection in Stride 52

What's Behind U. S. Inspection And What It Involves 54

AMS Reports on Progress 66

Nash Pumps of "PYREX" BRAND GLASS
A new tool for the *Food Plant*

The Food Industries will find the new Nash Pumps of Glass particularly adaptable to the exacting liquid handling requirements of this field. Constructed of heat and shock resisting "PYREX" brand glass, they present a means of transferring liquid food products without impairment of flavor or quality. Food and glass have long been closely associated, and now Nash Pumps of Glass permit another step.

All working parts of these centrifugals, including impeller and casing, are constructed of sparkling glass, with complete transparency, permitting constant inspection of product for color and condition. If pump needs cleaning it is immediately made visible, and the pump may be readily opened, cleaned, and reassembled. A unique mechanical seal replaces the conventional stuffing box. Not only food products, but hot acids and brine cooled liquids are handled with equal facility.

Nash Pumps of Glass are at present available in two sizes, a 6000 gallon per hour unit for large installations, and a unit with a capacity of 10 gallons per minute for small installations, and laboratory and pilot plant operation. Bulletins describing these sensational pumps in detail will be sent immediately upon request.

NASH ENGINEERING COMPANY
238 S. WILSON ROAD • SOUTH NORWALK, CONNECTICUT

First User of AMS Tells Why

Experience at this canning plant has convinced Cherry Growers, Inc., that AMS inspection and grading will benefit the entire industry

By A. J. ROGERS, *General Manager, Cherry Growers, Inc., Traverse City, Mich.*

IN order to understand the benefits to be obtained through the use of AMS continuous inspection and grading to U. S. grades, particularly as it applies to the cherry canning industry, it seems best to introduce the subject with a brief statement of the problems of the cherry canning industry and our own problems within the industry. Even before we committed ourselves to the help of Agricultural Marketing Service, we had adopted a policy of merchandising a quality pack. Our endeavor to maintain a quality pack all too often placed us at a disadvantage, selling against less carefully processed cherries of lower quality than ours in a market buying at the bottom price.

During the last ten years the production of red tart cherries has practically trebled. This, coming at the time of the depression, resulted in poor returns to both grower and canner. The price spread for canning has been so small that many canners have endeavored to reduce the cost of processing by reducing the cost of labor and by endeavoring to reduce the shrinkage connected with the processing.

The tougher the market, the more canners feel they are required to cheapen the product. This makes marketing more difficult. What is worse, the lowered quality of the pack is certain to turn many consumers away from canned cherries to other foods. Our contention has always been that whenever a substandard or poor quality can of cherries is offered to the public, regardless of the canner who puts it up, it decreases the demand for canned cherries and injures the whole cherry canning industry.

A canning institution such as ours—a cooperative—has limited resources with which to acquaint consumers or buyers with the quality of its pack. Even buyers who have been using our pack for many years have insisted, when it came time to contract for their next year's requirements, that we price our merchandise to meet the lowest price offered. They have even been willing to accept a lower quality in order to buy at the lowest price offered by the trade. The usual comeback to our statement of the quality of our cherries has often been "how can you prove that your quality is better than so-and-so's?"

All canned foods processed under continuous inspection by AMS have the U.S. shield embossed on the can lid.

A number of years ago a malicious rumor was spread throughout the trade that our pack was filled with pits. This rumor reached the bank which was financing our activities. Though this rumor was, for the most part, without any foundation, we believed it necessary to establish the unshakable confidence of everybody with whom we dealt. Therefore we applied for Federal inspection under what was then the Bureau of Agricultural Economics. Our entire pack that year was graded and certificates issued on each lot at a cost to us of less than $2,000 for the entire pack.

The result of this inspection proved that over 90 per cent of our pack graded U. S. Grade A Fancy. This not only validated our claims of quality, but was something which we wanted very much to merchandise to the trade—buyers and consumers alike. The certificates of quality which were issued by BAE were, according to law, *prima facie* evidence in any court that the quality was as represented. We saw no reason why this quality should not be heralded on our labels. However, we were informed, in no uncertain terms, that if this information was printed on the labels we most certainly would be prosecuted and get into all kinds of trouble with the Food and Drug Administration.

The question we then asked was: "What can be done in addition to this type of inspection to enable us to put a statement of U. S. grade on our labels?" Unfortunately, we had to wait two years for the answer. This came when the continuous inspection service of AMS was made available to canners.

Agricultural Marketing Service inspectors check and pass on the quality of the incoming fruit and inspect the canning process up until the time the cherries have been processed in the can. They then grade the finished product for quality, which they designate according to U. S. grades. Placing our plant under the continuous inspection and grading system of AMS would permit us to place the AMS insignia and U. S. grade on our labels and also to have the U. S. shield embossed on the end of our can. To Cherry Growers, Inc., committed to processing the highest possible quality of pack, the AMS service offered real inducements.

AMS Reduces Operating Cost

In some seasons mother nature is not so good to the cherry growers and canners as in other seasons. Continued severe winds bruise the fruit to such a degree that many wind-whipped cherries should and must be removed to obtain a pack of Standard grade or better. In some seasons a scourge, known as the shot-hole fungus, will visit one community or another, particularly when the growers have become somewhat lax in their spraying schedules. As a result of this scourge, the fruit becomes bitter and unfit for human consumption. In such seasons, the need for careful inspection from the time the fruit is picked until sealed in the cans is essential to producing even a standard pack.

Most canners pay growers on a basis of perfect fruit. Samples are taken of cherries in much the same way as samples are taken of beans or any other agricultural commodity. While this method of purchase of raw material does actually raise the general average of quality delivered, many cull cherries have nevertheless found their way into the cans, practically "free of charge."

To remove all of the imperfections from some loads of cherries, in order to qualify the remainder to grade U. S. Grade A Fancy, would cost too much in proportion to the sales value. AMS inspectors voluntarily segregated the poorer loads of cherries from the better loads which could more readily be sorted to grade U. S. Grade A Fancy. This was one of the services which helped to reduce the cost of AMS inspection. It prevented slowing up the production line and throughout the season proved to be a very real service.

In our cannery in 1939, when the quality of the incoming cherries was unusually bad, not one single case of substandard cherries was packed. In contrast, inspection of products of competing canneries made by the same inspectors who graded our pack revealed that substandard goods were the rule rather than the exception for the year 1939. We believe it unfortunate that facilities of the Food and Drug Administration are so limited that these substandard packs cannot be ferreted out to definitely discourage the packing of cheap, inferior quality cherries.

AMS Aids Quality Control

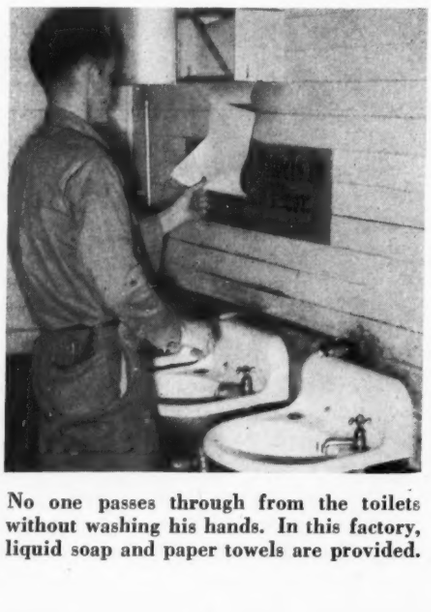
Checking on the pitting, on the color of the cherries, on the fill of the container, and on the cooking, as well as the constant inspection to maintain required sanitary conditions within the factory itself, all are a part of the total inspection under AMS. This serves as a double check on factory operations and assures the finest quality we can produce. At any moment when conditions vary so that cherries are not making U. S. Grade A Fancy when they are supposed to be U. S. Grade A Fancy, or when they are not making the requirements for Grade C, when that grade is being processed, we are notified by the inspector. Proper measures can then be taken to correct the situation. This is a distinct advantage. It enables us to know at all times that we are producing the grade we are endeavoring to produce. We cannot be guilty of intentional or unintentional errors in our labeling.

There is no doubt in my mind that labels carrying the two AMS shields tell more definitely what is in the can than labels with any other designations or descriptions. While the trade is generally uninformed about U. S. grade labeling, I believe there is a growing favorable reaction to the U. S. grade shield and the shield designating processing under continuous inspection. I also believe the AMS shield on the label is of greater benefit to the average or small canner than to the large canner who is able to advertise his brand on a national scale. I believe, too, that AMS shields on the label can benefit equally the manufacturer who packs under his own label or the manufacturer who packs for buyers' labels. It is logical that, as the public becomes more acquainted with the AMS shields on the label, buyers will become more and more insistent on these labels.

AMS Costs Moderate

When AMS inspection service was first instituted in our plant, some employees were not particularly cooperatively minded. Today, however, we have not an employee in the plant who does not welcome the inspection and who is not convinced that inspection is a complete success in every way. Our employees have come to regard the inspector as one of them. Nothing is kept from him. Very definitely the cost of inspection is greatly decreased as the result of this cooperation. The cost of AMS service to Cherry Growers, Inc., during the past two years, has been ¼ of 1 cent per case of 24 No. 2's and 35/100 of 1 cent per case of 6 No. 10's.

In certain markets there has been a brisk demand for graded goods this past season. In one market in particular we have been able to obtain enough more for the U. S. Grade A Fancy cherries to pay for the cost of grading. As the public becomes more grade conscious, the cost of inspection will be completely absorbed. About the only unfavorable reaction to AMS inspected and U. S. graded cherries has been by buyers and distributors tied up with large nationally advertised firms.



No one passes through from the toilets without washing his hands. In this factory, liquid soap and paper towels are provided.

Our cannery is a cooperative. Our producers are anxious that the canned products be of as high quality as possible. It is the choice of the producers that our plant has and will continue to process under AMS inspection for U. S. grades.

Acceptance of AMS Labels

Approximately 50 percent of our Grade A Fancy production this year went into distribution under our own label. Not all of the remaining 50 percent which went out under buyers' labels carried the AMS shields designating quality and continuous inspection. Cherries are not graded "B". Up to the present, U. S. Grade C Standard cherries have not gone into distribution with the grade designation on the label. However, the U. S. shield embossed on the can indicates that the contents have been processed under continuous Federal inspection. Our Grade A Fancy cherries are gaining acceptance. We have evidence to show that some jobbers have increased their usual requirements due to our U. S. Grade A Fancy markings on the label. We believe also that the AMS shields on our labels is slowly extending our area of distribution.

We would welcome the extension of AMS inspection and grading to all canning plants possible. That would accomplish just what we hope for most; namely, the education of the consuming public to an appreciation of quality in canned foods. We would even welcome it if cherry canning plants manufacturing products in direct competition to us were to place themselves under AMS inspection and grade labeling. We would then know that the standards of these plants would be measurably improved. This would greatly help, not only in removing possible undesirable plant conditions, but also undesirable trade practices.

Though welcome, it does not seem necessary to us that every canner should operate under AMS inspection and grading. When the public becomes aware of the quality and values in canned goods which can be obtained in cans bearing the U. S. shield, they will demand a quality in all canned foods which will compel all canners to raise their standards much above what has prevailed for the last few years. This undoubtedly would benefit the industry as a whole. Unquestionably such action would greatly increase the total consumption of canned foods.

"If This Be Treason Make the Most of It"

Whatever others may think, our operation under AMS has improved employee efficiency and morale, raised the quality of our product, increased the acceptance for our brand and stabilized our market—all at moderate cost

By PAUL STANTON, *Vice-president and General Manager, Florida Fruit Canners, Inc., Frostproof, Fla.*

SPEAKING as a canner, three-quarters through his initial season of operation under AMS inspection, I am convinced that it is good. Good for both the consumer and the canner. I am glad our own "Silver Nip" line of citrus products carries AMS shields on the labels, not only because we have found it profitable but also because we are more certain of maintaining top quality and improving consumer acceptance than ever before.

It is reasonable to assume, in the light of past events, that informative labeling was a long step toward better understanding between canner and consumer. Results proved this contention conclusively. The popularity of informative labeling was immediately evident from the very inception of the movement. The consumer, however, has greater confidence in canned products whose labels carry the two AMS shields, the one certifying the U. S. grade, the other certifying that the product was processed under continuous government inspection.

To the canner, the chief benefit is that of a preventive. AMS definitely sets certain rigid boundaries beyond which the canner dare not go, boundaries which otherwise, in face of economic pressure, the canner might of necessity be forced to ignore. The food canning industry is a highly competitive one. Not only do foods compete with foods, but individual foods compete with themselves within the limits of their respective classifications. It is in this latter category that U. S. inspection, in my opinion, demonstrates its chief value. The stamp of governmental approval precludes the possibility of serious competition by foods canned under what might be questionable circumstances.

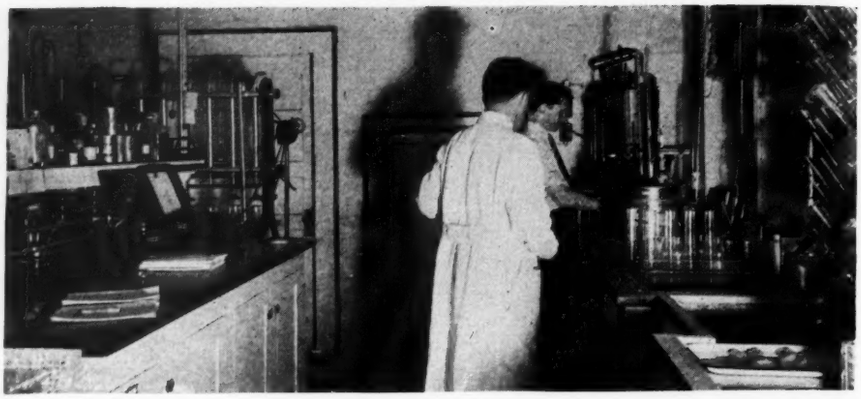
Elementary reasoning leads to the obvious conclusion that in the canning of any food crop the bulk of the crop must be accepted in order to procure the best of that crop. Under ordinary circumstances, economic necessity demands the canning of as great a portion of the raw material as possible, if the maximum return upon the investment represented is to be realized. The natural result is a gradual lowering of the individual canner's standards to meet this condition, until finally all ideals of quality are lost and forgotten.

Mary Margaret McBride, writer and columnist, inspects plant sanitation in a Florida citrus canning plant under AMS. Federal inspector George Crisp, assigned to Florida Fruit Canners, explains how AMS determines the quality required for various U. S. grades.

AMS inspection precludes such a possibility because it covers not only the processing and packing but also, by hourly tests, the quality of raw material entering the cannery. This season in which we are now engaged offers a notable example of what government grading will do to the early pack.

No Compromise with AMS

Frankness compels the admission that at the outset of the year we were no little dismayed to find that fruit which in past seasons had been considered canning quality could not meet the requirements under AMS for a U. S. grade higher than "Standard" or "C." As a result, we were forced to withhold opening prices while competition accepted this fruit, canned it under fancy labels and hit the market with a bang.



AMS inspector and plant chemist in the laboratories at Florida Fruit Canners, Inc., Frostproof, Fla.

Florida Fruit Canners plant at Frostproof, Fla.

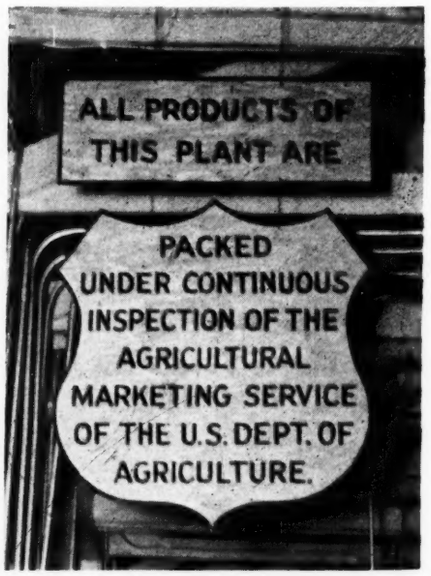
Here it was that AMS grade labeling stood the acid test. The early season rush, instead of weakening our position, had a decidedly stabilizing effect. Our customers, assured of top quality under the inspection service, calmly sidestepped the first hysterical rush and awaited salable merchandise which was soon forthcoming. This surety of quality noticeably reduced the temptation on the part of many buyers to accept "under market" offers on early quotations, the wisdom of which has certainly been thoroughly substantiated by subsequent developments.

Of secondary importance, but nonetheless interesting, has been the wholehearted acceptance of this AMS inspection by our employees. They take our participation in this program as a matter of pride. The presence of uniformed inspectors has had a tendency to increase individual effort and efficiency rather than arouse suspicion and resentment as might reasonably have been expected. Employees never fail to point out to the many hundreds of visitors to our plant the huge AMS shields which hang in conspicuous places. Even personal appearance and cleanliness which in past years has been almost a fetish among our employees has improved perceptibly under the new regime. To all intents, the fact that the plant is under AMS inspection has aroused a spirit of friendly competition in which workers' skill and effort is pitted against extremely high standards. Even the resident inspector is subject to much good-natured bantering because he fails to find juice that will not make the grade. There exists, as a result of this service, an undeniably higher conception of quality among the workers.

This higher concept is also shared by the consuming public, if reports from our sales outlets and from customer's study groups are to be accepted as a cross section of public opinion. The inquiries which pour in from every corner of the nation denote genuine interest in and approbation of U. S. inspected and grade labeled foods. It is a notable fact that out of these hundreds of letters we have never yet received a single word of criticism regarding this new service.

Another highly interesting phase of this situation is the growing preference on the part of the buying public for U. S. grade labeled products produced under continuous inspection, rather than for the products labeled plain A, B and C, (not U. S. grades) and not packed under AMS continuous inspection. Many canners and distributors have attempted to offer the latter as substitutes for U. S. graded products produced under continuous inspection and graded to the more rigid government standards.

It may sound like a harsh indictment, but we canners know, and the public knows, too, that the thousand-and-one ways to "beat" ordinary A, B and C grading can be augmented by a like number of devious methods, if the occasion arises; and the canner who insists upon forcing this type grading upon a well-informed public is doomed to dis-


ALL PRODUCTS OF THIS PLANT ARE
PACKED UNDER CONTINUOUS INSPECTION OF THE AGRICULTURAL MARKETING SERVICE OF THE U.S. DEPT. OF AGRICULTURE.

Thousands of visitors wintering in Florida visit the citrus canning plants each year. In the Florida Fruit Canners plant, Frostproof, the AMS shields, hung in conspicuous places throughout the plant, stimulate many questions.

appointment. I firmly believe that AMS inspection is the weapon with which the consuming public can and will enforce its demand for greater respect from the canner and distributor whose ethics may bear renovating.

U. S. Inspection Will Spread

It is no strain on the imagination to believe that the government inspection of meat has built the foundation for a structure which will, when completed, encompass all processed foods. This possibility was forcibly brought to my attention a short time ago when, during a conversation with an executive head of one of this country's largest buying organizations, he remarked:

"Say what you will, there is a certain respect, almost reverence, on the part of the buying public for that U. S. shield. This confidence is not accorded to canners individual grading, even though the product under consideration may be offered by a firm of unimpeachable integrity."

He is right. In this day of high-speed merchandising, descriptive superlatives are tossed about with little or no regard for strict truth. It has simmered down to a point of one person's word against another's. The public, with tongue in cheek, takes all with a grain of salt.

The instinctive trust imposed in the U. S. shield, to me, is the most natural reaction in the world. Regardless of political "ins and outs," the public knows that the Department of Agriculture, the Food and Drug Administration, the Bureau of Animal Industry, and all the other government agencies charged with safeguarding the public health and welfare, have never yet thrown them a curve. They, therefore, unhesitatingly accept merchandise bearing the U. S. shield of continuous inspection and grade designation as above the chicanery engendered offtimes by present-day business methods. They trust it, and back up this trust with purchases.

Market Reaction to AMS Labels

It is true that our decision to operate under AMS supervision has in a few isolated instances cost us business. There will always be those who are afraid to try any innovations. Our compliance with the provisions of AMS inspection and grading has on the other hand given us entrée to many sales outlets heretofore closed to our line. The balance is definitely in favor of the new business, from a volume basis as well as economic basis. It is doubtful whether any great reform has ever been accomplished without demanding sacrifice to some degree from those who first subscribed to it.

..saves Money for You!

THERE are sound reasons ... actual facts ... to back up the statement that tested Oakite cleaning can save money for you. First, you have the experience of canners and packers of fruits, vegetables, soups, meats, fish ... food plants of every description now using dependable Oakite cleaning and germicidal materials. Here are just two of many examples that illustrate this:

Cleaning stainless steel cookers in one Eastern plant formerly was a two-hour job of scraping and scrubbing. Now ... simply by soaking cookers with recommended Oakite solution, followed by rinse and light brushing, equipment is cleaned in 45 minutes!

A Mid-western fruit juice canner's problem was cleaning kettles used for cooking prune juice. The job usually took two men an hour. But since an Oakite material has been used, considerably less scrubbing is needed ... kettles are now cleaned in HALF the time previously required!

Ask Us to Prove It

Have you a cleaning problem you want performed better, faster? Then put tested Oakite cleaning to work ... see with your own eyes the improved results it gives you, and how it saves you money. Write today ... no obligation.

Complete Nation-Wide Service For These Industries

- CANNING
- CEREAL PRODUCTS
- MEAT PACKING
- SEA FOOD
- CONFECTIONERY
- COLD STORAGE
- DAIRY
- BOTTLING
- FLAVORING EXTRACTS

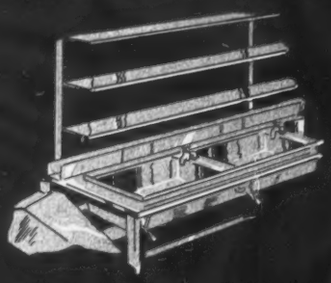
OAKITE *Tested* CLEANING FOR QUALITY CONTROL

Manufactured only by

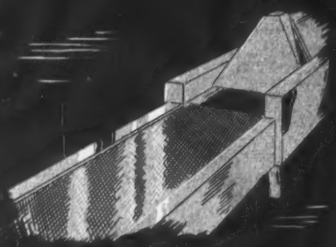
OAKITE PRODUCTS, INC., 26G THAMES ST., NEW YORK, N. Y.

Representatives in All Principal Cities of the United States and Canada

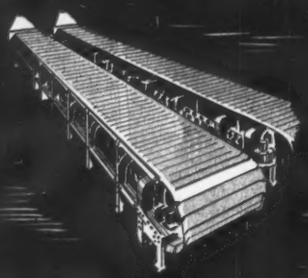
STAINLESS STEEL
resists food acids in processing equipment



Stainless steel canning sinks (above) for preparing fruits and vegetables and kettles (left) for cooking them.



Stainless steel wire-cloth belt for conveying frozen fruits at a temperature of 40 degrees F.



Stainless steel conveyors for inspecting viscera of beef are easily kept clean and sanitary.

Stainless steel chute used for conveying cuts of meat to lower floors in a packing plant.

THROUGHOUT the food industry the advantages of stainless steel for food processing equipment are widely recognized. Its resistance to the action of food acids makes it ideal for equipment which comes in contact with food products. Canners, preservers, and meat packers will be interested in these advantages of stainless steel:

1. **Eliminates Contamination**—prevents metallic contamination . . . imparts no off-flavors . . . protects colors.
2. **Assures Sanitation**—resistant to cleansers and sterilizers . . . smooth, polished surface reveals all dirt.
3. **Simplifies Maintenance**—resistant to citric, acetic, and other food acids . . . no rusting during idle periods.
4. **Prolongs Equipment Life**—withstands high pressures . . . stainless throughout—no coating to chip or wear through.

Although we do not make steel of any kind, we have for over 30 years produced "Electromet" ferro-alloys used in making steel. With the knowledge accumulated from this experience, we are in a position to give you, without obligation, impartial assistance in the selection of a stainless steel for your particular problem. If you do not know the fabricators of stainless steel in your area, write us.

ELECTRO METALLURGICAL COMPANY
Unit of Union Carbide and Carbon Corporation
UCC
30 East 42nd Street, New York, N. Y.
In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario

Electromet
Trade Mark
Ferro-Alloys & Metals

Our induction into AMS ranks, however, has been a pleasant one. Under the able direction of Paul M. Williams, Senior Marketing Specialist of the Agricultural Marketing Service, we have experienced little difficulty in fitting our canning methods to conform to the exacting standards of AMS. I would consider it an opportunity lost if I did not at this time acknowledge the splendid spirit of cooperation evidenced by this entire agency from the department heads right through to our resident inspectors.

To many of our confréres in the canning industry, our opinion of AMS inspection and grade labeling and the results we have achieved under it are most distasteful. With apologies to Patrick Henry, however, we repeat: "If this be treason, gentlemen, make the most of it." We are convinced that U. S. grades and continuous Federal inspection are here to stay—that they will prove to be important factors in curing many of the ills which beset the food canning industry and, furthermore, that the tidal wave of public approval in their favor has begun to roll with an irresistible force, which will eventually sweep all food canners, either willing or unwilling as the case may be, under their standardizing and their controlling influence.

We of Florida Fruit Canners, Inc., like AMS inspection and expect to pack under it again in seasons to come.

Manufacturers' Brands Benefit From AMS Shield on Labels

United States Products Corp. builds buyer and consumer good will with AMS insignia on its own labels

COMMENTING on his company's attitude toward continuous plant inspection and U. S. grading under Agricultural Marketing Service, D. C. Kok, president of United States Products Corp., Ltd., San Jose, Calif., gives several reasons as to why his company first became interested in AMS.

It is the belief of this company that AMS inspection, if carried out in all canning plants, would do away with illegitimate competition which offers merchandise not exactly up to standard in competition with the merchandise of packers who are conscientious regarding the quality of the products packed. Therefore, inspection and grading by AMS would tend to benefit the more conscientious canners.

In the past, buyers could not always be certain of receiving that they thought they bought. But now, the AMS inspection service and grading certification guarantees to buyers that the mer-

Labeling line where the labels certifying the U. S. grade and processing under continuous inspection are added to United States Products Corp.'s glass pack. Only U. S. Grade A is packed for the company's "Signet" brand of California fruits.

chandise shipped will be in exact conformity with the merchandise purchased. This benefits both buyer and seller and removes any basis for dispute between the two regarding the quality of the product which was ordered and the quality of the product received.

United States Products Corp., in considering the placing of its plant under AMS inspection and U. S. grading, believed that consumers would be given a guarantee to which they were entitled. The U. S. grade would guarantee to the consumer that the quality stated on the label was actually the quality of the product in the can. Regarding the attitude his company in considering the possibility of continuous Federal inspection, Mr. Kok stated:

"The rules and regulations of the AMS, as far as plant sanitation is concerned, are very strict. From that standpoint alone I consider it a great advantage for the consumer to know that in AMS inspected plants the last word in sanitation prevails."

There was still another reason why United States Products Corp. believed AMS inspection and grading would prove advantageous, especially at the time adopted. The company had developed and planned to market a line of glass-packed merchandise. The company believed that it would be advantageous to have the AMS shield and certification of continuous inspection appear on all the labels for this new package from the time of its introduction.

After several discussions with representatives of the Department of Agriculture, this company was "convinced that Federal inspection in general was a very good thing for the industry and would give buyers as well as consumers more protection."

Efficiency Improved

The experience of United States Products Corp. during the 1940 season and since has justified expectations. This experience is the basis for the following comments on the various phases of the operations under AMS inspection and U. S. grading:

"At the time the inspection service started in our plant, there were, as was to be expected, some adjustments necessary between our personnel and the AMS inspectors. But we did not encounter any serious difficulty. In general, the extremely sanitary condition the plant was in, and the improvements that were made upon the suggestion of AMS inspectors, lifted the morale of our workers quite substantially.

"The cooperation increased in the course of the canning season, especially with the help of the AMS inspectors, who showed a decided spirit of cooperatoin rather than arbitration. We have had decided evidence of increased efficiency during our operating season under AMS. Most of the inspectors are very intelligent and have been helpful."

United States Products Corp. reported no evidence of an increased proportion of higher grades as a result of inspection and grading by AMS. To the contrary, this company believes that a slight decrease in the proportion of higher grades may be expected as a result of AMS inspection and grading. Neither does United States Products Corp. believe that any savings are effected under AMS to offset the gross cost of the service. AMS continuous inspection and grading service in this plant did raise the cost slightly, though the costs of samples for cutting, scoring and grading were not perceptibly increased because of AMS inspection and grading. Depending on the size of this pack, the actual gross cost of AMS inspection and grading to the average canner, according to the experience of United States Products Corp., should vary somewhere between $\frac{1}{4}$ of 1 cent and $\frac{1}{3}$ of 1 cent per case of 24 No. 2's.

In commenting on the changes and improvements necessary to meet AMS requirements and the cost thereof, Mr. Kok states that "it is almost impossible to describe the nature of the improvements in our plant even though the improvements represent an accumulation of minor things which in the aggregate amount to something quite substantial." He points out that his company maintained a very high degree of sanitation in the plant at the time AMS took over.

During the 1940 packing season, the percentages of U. S. grade labeled products under the companies' own brands and under buyers' labels were approximately the same. As a result of this fairly evenly divided distribution, United States Products Corp. is in a position to gage the benefit of AMS both to the canner packing for buyer's labels and to the canner packing for distribution under his own brand.

Manufacturers' Brands Benefit

This company believes "that AMS inspection and grading will greatly benefit those packers who feature their own brands. The grading and inspection shields complicate matters quite a bit for buyers who distribute under their own labels. Since the entire industry is not under AMS inspection and grading, buyers can purchase U. S. graded products from only those few packers whose plants are under inspection. This severely handicaps the buyers who want to 'shop around' for the cheapest price regardless of quality." The United States Products Corp. believes, decidedly, "that the presence of the AMS shields on the label aids the manufacturer who is interested in promoting the sale of his own brands."

This company "would welcome an extension of the AMS inspection to the industry in general because of the advantage, as stated above, of eliminating unfair competition." The company would "prefer the application of AMS inspection to only a few additional plants. It is our opinion that for the time being the inspection should be held down to as few plants as possible until it emerges from the experimental stage and until the industry as a whole is willing to acept AMS inspection. This company looks forward to the time when all canning plants manufacturing products in direct competition raise standards sufficiently to meet the requirements of AMS inspection and grading. When and if this is accomplished, it will help to remove undesirable plant conditions and undesirable trade practices."

Reactions of Trade and Consumers

According to United States Products Corp., the reaction of farmers and producers to AMS inspection and grading seems to be favorable. Trade reactions both from chain stores and independent retailers has also been favorable. "Some wholesale grocers," the company states, "who merchandise their own labels, are strongly opposed to U. S. grade labeling."

"The experiment is in too preliminary a stage as yet to determine the reactions of the consumers if measured by repeat sales." However, the company believes that the public in general is in favor of AMS grading. To substantiate this belief, the company points out that "recently we launched a very thorough investigation of consumers' reactions through an important national institution. The results from the replies indicate that 80 percent of the consumers prefer both the U. S. grade shield and the inspection shield; about 19 percent were satisfied with grade labeling with no inspection shield."

EDITOR'S NOTE:—In the absence of further evidence the results of this study might be interpreted to indicate that continuous Federal inspection guaranteeing the health of employee and maximum sanitation in the plant is quite as important to consumers as the designation of grade—possibly more so.

"We want precision! We want speed!" That's America's order to U. S. industry, and *your* order to your plant.

You know that workers need maximum light for *fast,* accurate results. Yet it takes costly time to put on a two- or three-coat paint job. Time you can ill afford. You need a mill white that will do the job in double-quick time.

You need DULUX High-Hiding Mill White . . . because it does most repaint jobs with ONLY ONE COAT!

With DULUX the paint crew goes down the line once. Production returns to normal much faster than if several coats were needed. You save plenty on material and labor costs with DULUX, too.

Your workers get brilliant light reflection with DULUX because of its intense whiteness. And because it stays cleaner and resists yellowing, DULUX *keeps* its brilliant whiteness. This durability of DULUX means a longer time between repaintings, greatly reduced paint overhead. Find out more about DULUX High-Hiding Mill White.

SEND IN THE COUPON FOR COMPLETE INFORMATION...

USE DU PONT REG. U. S. PAT. OFF. DULUX REG. U. S. PAT. OFF. HIGH-HIDING MILL WHITE

E. I. du Pont de Nemours & Co. (Inc.)
Finishes Div., Dept. F-51, Wilmington, Del.

Please see that I get complete information about DULUX High-Hiding Mill White.

Name.....

Address.....

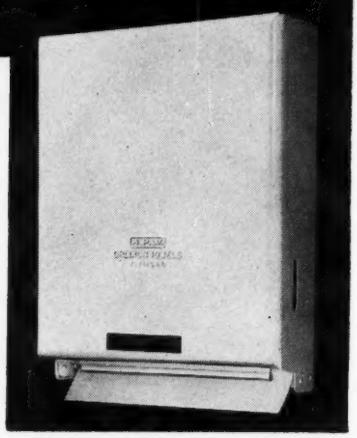
City.....

State.....

Where Clean Hands are a Must ... Red Cross Onliwon is the How

CLEAN HANDS are one of the most important requirements in all plants which use U. S. Grade Labeling.

PAPER TOWELS are a part of the necessary sanitation specifications.

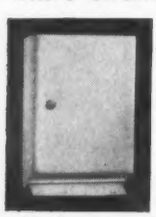


Sanitary Red Cross Onliwon Paper Towels provide the utmost in sanitary protection. They give the user an individual towel, a clean towel, a fresh towel, a safe towel every time that hands or face are dried. The Red Cross Onliwon Cabinet dispenses one towel at a time and guards the remaining supply from dust, dirt and handling.

Economical — Red Cross Onliwon Towels cost less per user because

- they are double folded, one towel for each hand, yet count as one.
- The two drying surfaces provide doubly quick absorbency because the moisture from wet hands soaks from one surface of towelling to the other.
- the double surface gives the towels double strength, which means less towels used.
- the size is designed small enough so that every inch of the double surface gets used, yet large enough so that one towel dries a pair of hands thoroughly.
- one Red Cross Onliwon Towel does the job of two or three ordinary paper towels.

RED CROSS ✚ ONLIWON Towel Cabinets can be refilled when partially empty, are easily kept clean, and prevent waste of towels or loss through theft. They are constructed of heavy gauge steel and have no moving parts, which means extra strength and long wear. Available in green enamel, white enamel or chromium finish.



RED CROSS ✚ ONLIWON Cabinet Toilet Tissue is a companion service to Red Cross Towels. It is more sanitary and economical than roll toilet tissue service, and is particularly designed to meet the strict washroom requirements of food plants.

A letter from you on your company letterhead will start a Red Cross Onliwon Towel Cabinet and sample packages of the three grades of towels — including the remarkable New Improved Process No. 487 — on their way for you to try.

Write to A. P W. Paper Company, Inc., Albany, N. Y.

RED CROSS ✚ ONLIWON

AMS Inspection Means More Sales at a Profit

Buyers haggle less on the price of foods packed under AMS inspection, so canners don't have to lower quality to meet a price

As told to Ivan C. Miller by PERRY MYERS, ***President and Treasurer, Wegner Canning Co., Eustis, Fla.***

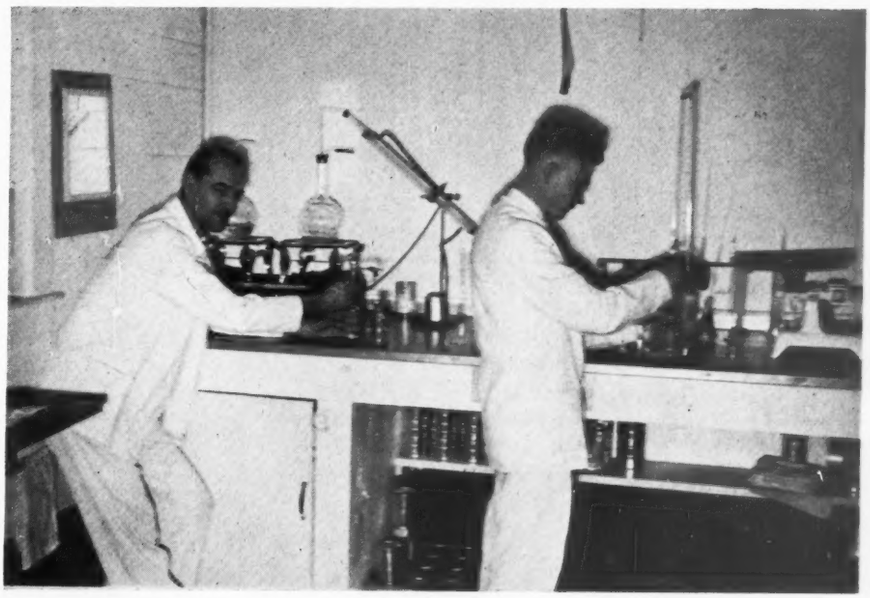
EVERY canner in the country knows the abuses in the canned food business. Every canner knows that both canners and buyers are responsible for these abuses. We all know that too much of the foods canned in the country, should never be canned, for the good of both canners and buyers. All of us know also that too often the label doesn't tell the truth about what is in the can.

There isn't a canner in the country who doesn't know from costly experience the price attitude of buyers. And there are also quality-minded buyers who know too well the price attitude of competitors. This situation isn't new. Quality has been hammered down for years. Anything for price. But labels and advertising haven't changed.

The sorry part of it all is that both canners and buyers have been so busy with their own struggles over price that they haven't watched the sidelines. Two groups of onlookers haven't liked the play—the consumers and the government. Both have heckled. But the canners and the buyers haven't listened.

If ever there was "handwriting on the wall" it has been recently—handwriting written directly to canners and canned food buyers. We of the Wegner Canning Co. thought we saw this handwriting and understood its meaning when we applied to Agricultural Marketing Service for continuous inspection and U.S. grading of our products in our plant at Eustis, Fla., but this wasn't the only reason we wanted continuous inspection. It certainly wasn't the only reason we wanted out citrus juices graded by AMS according to U. S. grades.

We wanted to produce the best quality juice we could from Florida citrus fruits. We wanted to label our products so that the buyer and consumer could be certain that the label told the truth about the contents. We wanted to get a fair price in proportion to the quality we had to sell—no more, and certainly no less—as in the past. Above all we wanted to build both buyer and consumer acceptance for the uniform U.S. Grade A quality of citrus juices packed under our own label. We haven't been disappointed.



AMS inspector and plant chemist in laboratory of Wegner Canning Co., Eustis, Fla. In this laboratory samples taken at 15-minute intervals are analyzed as a constant check on the quality of the juice.

AMS has been cooperative—Paul Williams, Senior Agricultural Marketing Specialist, and the AMS inspectors assigned to our Eustis plant. Our employees, too, have responded to the challenge of Federal inspection and the requirements of meeting with standards set by AMS. The AMS inspectors have been more than cooperative. They have been accepted by the plant employees as one of them. Both employees and inspectors have worked together in friendly rivalry.

This does not mean that the inspectors have for one moment relaxed in their vigilance or compromised in the rigid requirements. Citrus fruit at "bargain prices" has been bought by other canners not under AMS after being turned down by the AMS inspectors assigned to our plant. Also, juice the equal of many cans of juice sold as "Fancy" has been graded as U. S. Grade C by the AMS inspectors working in our plant.

Producers Approve of AMS

An inspection service which prohibits a canner from accepting whatever fruit he may see fit to buy may not appeal to all canners. Certainly producers might

3rd PLACE IN 4 YEARS!

Service did it . . . courteous, helpful service provided by Crown Can factories and field laboratories strategically located . . . and by Crown food technologists and service men in every section on call whenever you need them.

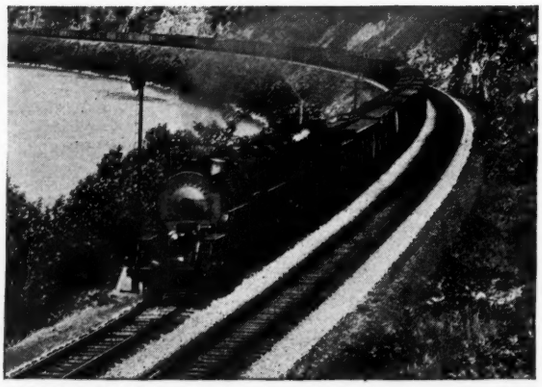
PACKERS DON'T BUY CANS . . . THEY BUY SERVICE!

Turning out a lot of cans at a lot of places ON TIME is a bigger job than most people realize. But Crown customers know that they can put full faith in Crown service. Past performance has built that faith . . . the one thing more than any other that has moved Crown Can up to third place in a highly competitive industry in only four years!

CROWN CAN COMPANY, PHILADELPHIA, PA.

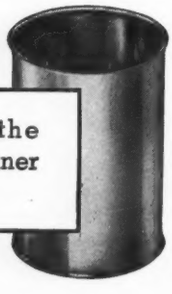
Division of Crown Cork and Seal Company

BALTIMORE ST. LOUIS HOUSTON MADISON ORLANDO
FORT WAYNE NEBRASKA CITY



ON TIME! Where the car is when you want it makes a tremendous difference! Crown Can makes sure it is on *your* siding on time. Service that saves and pays!

Crown Cans meet the highest standards. No finer cans are made.



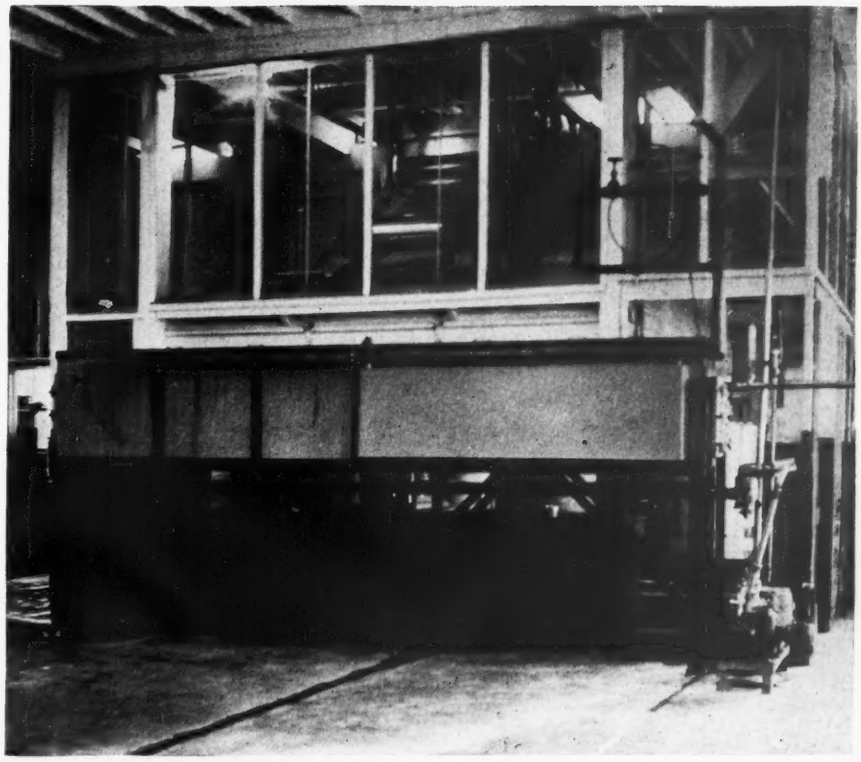
CROWN CAN

INDEPENDENT AND HELPFUL

have reason to disapprove of such a service which can condemn as worthless a portion of the crop.

Strangely enough this has not been the attitude of growers in the area supplying our cannery at Eustis. Fortunately these producers realize that if they are to make a continued success of citrus fruit growing, the public at large must buy increasing amounts of citrus fruits and citrus products. They also know that, as producers, they must expect most of the increases to come through the expanding consumption of canned citrus products. And fortunately again, they know that decreases in total consumption follow marketing of inferior products canned to sell in a strictly price market. Producers in our area are in favor of AMS and abide by the government's decisions on incoming fruit.

We as canners can't complain because some of the incoming fruit is turned down as inferior. It's the results that count—an expanding market for our product at a price which permits a fair profit. We are thoroughly pleased with the marketing reactions to our own brands of citrus fruit juices (only U.S. Grade A is packed under our own label). An example will illustrate why we are pleased with results.



The Wegner Canning Co. plant, under AMS inspection and grading in Eustis, Fla., is screened against insects. In addition to plant screening, that portion of the plant where the juice is extracted and prepared for canning is separately screened.

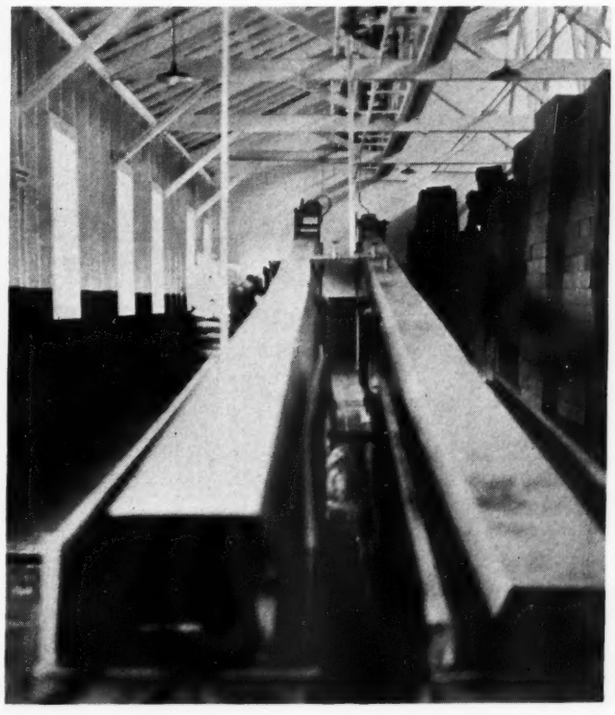
Buyers Respect AMS Guarantee

Early in this season a buyer bought a car of our juices packed under our own label. Shortly after that, the buyer called for quotations on three additional cars, asking for a price-shading on additional quantity purchase. We had to inform him that we had ample market for our products and wouldn't change the price from that of the first purchase. Much to our surprise, he ordered the three cars shipped at our price — grumbling, but admitting he had to have the merchandise. Buyers haggle less on the price of canned foods packed under AMS than on other canned foods.

We negotiated for AMS continuous inspection and grading service in our plant, believing the consumer's demands were justified and furthermore that they had been heard by the government. We believed that voluntarily meeting consumer's demands through voluntary adoption of AMS requirements was better than any form of compulsory compliance. We still believe this for ourselves and for the rest of the canning industry. We believe we are in the very front rank of the parade, because we believe that in time the entire canning industry will be compelled to adopt voluntarily the requirements of Federal continuous inspection and U.S. grading under AMS. We believe canners will be compelled to adopt inspection and grading, not by the government through any regulatory act, but by competition which will derive its strength from the preference of the consumer.

This is how strongly we feel the tide has turned: Because of our satisfaction with results from our experience canning Florida citrus juices under AMS at Eustis, we asked AMS to give us the same service at our plant at Sodus, N.Y. We asked the service from AMS but we didn't expect it, knowing the stringent requirements. We were turned down by the Agricultural Marketing Service.

But we are going to have AMS inspection and grading at the Sodus plant nonetheless. For we are tearing down, rebuilding, re-equipping and improving the plant sanitation. Whatever is necessary to meet AMS requirements we will do. That is what we think of AMS and its value in creating a bigger market for canned foods.



Improved type of cooler in Wegner Canning Co.'s plant, Eustis, Fla. Cans are conveyed up the incline to the labeling and packing room and cooled enroute by a cold-water spray and by the evaporation of the cooling water on the surface of the cans. Plenty of reflected light here from white ceiling and walls.

When Planning a MOTOR TRIP

or Buying a MIXER . . .

When you plan a motor trip into a new part of the country, or a section where you have not recently travelled, you know from experience that a good road map will show you how to get to your destination with the least amount of delay, expense and inconvenience.

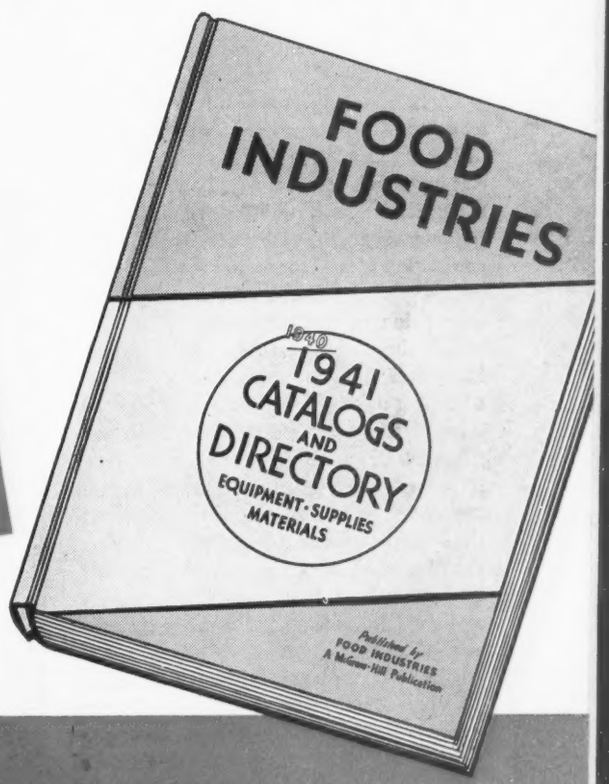
You automatically pick the best available roads and if it's country where you may have travelled at some distant time, you are usually pleasantly surprised to find new and better ways of getting around.

In much the same way, FOOD INDUSTRIES CATALOGS & DIRECTORY can chart your course when planning to purchase equipment. It will tell you just what is available in the most economical, efficient and improved equipment for your plant.

If it's a new operation, you can find out who makes the equipment you need. If it's an old operation, here again you'll be pleasantly surprised to find newer and better models for doing the same job in a better and cheaper way.

DO IT THE RIGHT WAY!

BE SURE YOU HAVE
ALL THE FACTS AT
YOUR FINGERTIPS



Food Industries Catalogs and Directory

330 West 42 Street, New York, N.Y.

Takes AMS Inspection in Stride

Schuckl made almost no plant alterations and incurred few problems under AMS. Finds inspection makes product more uniform and aids sales

By CHARLES F. BERRY, *Palo Alto, Calif.*

ONE of the plants requiring practically no changes or alterations to meet the requirements of the AMS inspection service was that of Schuckl & Co., Inc., at Sunnyvale, Calif. In general, the sanitary conditions, light, ventilation, lay-out, waste disposal, floor and machine cleanliness met with approval. In fact, with the exception of a few minor operations and a small amount of fly-screening around the sirup room, no departure from the regular routine was needed.

This plant was one of the five to use the service in 1940. Possibly the already sanitary set-up had something to do with the alacrity with which the voluntary service was accepted, since the company was able to obtain the benefits of governmental inspection approval without remodeling expense. In any event, the service was started experimentally with a single item last summer and each successive pack has been included.

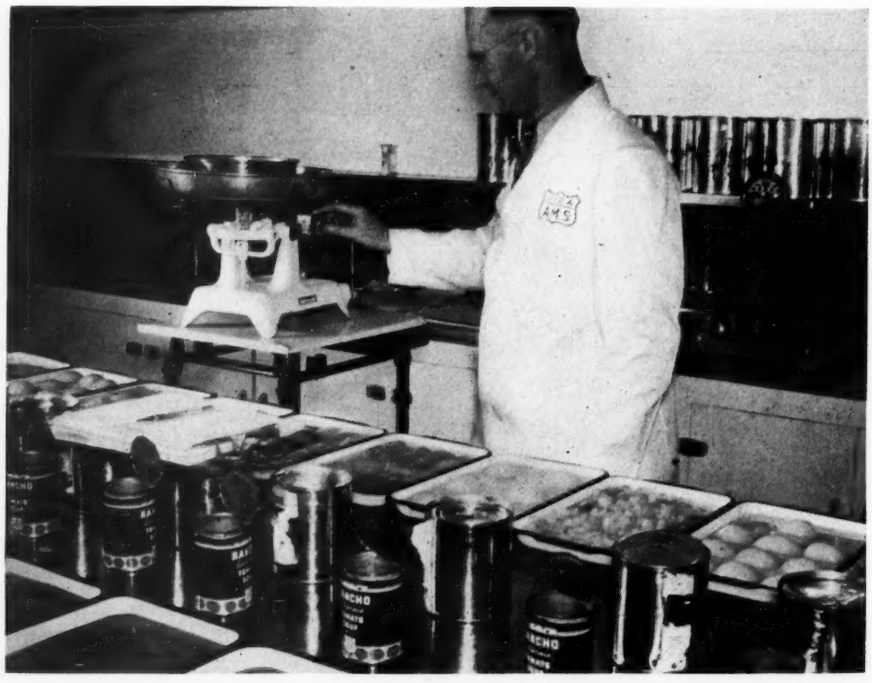
At first, the presence of government inspectors caused some concern and a little speculation on the part of the employees. The company, however, took the initiative in explaining to its workers the significance of the service and the distinction it conferred upon the company's products. Now employees take pride in the inspection.

For the most part, the AMS service has had no marked effect on the efficiency of the plant or upon production schedules. In several minor details, suggestions by the inspectors undoubtedly improved operations. At first, some of the requirements of the inspectors, particularly in regard to sanitary handling, seemed a little stringent. Gradually, however, the relationship between management and the government grew more cordial and cooperative. Inspectors, here as in other plants, obtained a closer view of some of the problems of plant operation. They, for instance, saw good fruit crushed because of the addition of an extra spoonful of sirup to meet exact drained weight requirements. The result was the removal of this particular provision and a more practical readjustment of inspection demands.

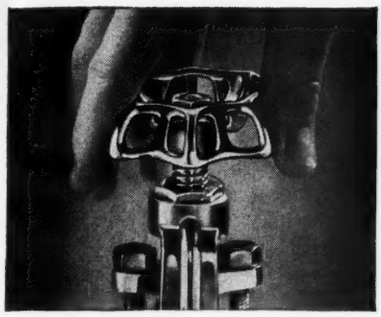
The principal products of the Schuckl plant are asparagus, peaches, pears, nectars, fruit cocktail, fruit salad, spinach, Boston baked beans, brown bread and "Rancho" brand soups. Since the service was initiated last summer, there have been several changes and additions in the Department of Agriculture standards. Of most interest to Schuckl were the addition of fruit cocktail and the new specifications for asparagus. Now, all fruits and vegetables packed at the plant, with the exception of fruit nectars, are covered by government standards. Baked beans are also graded, although brown bread has yet to attain specifications. The soups are canned under AMS inspection but, of course, lack a grade.

Apparently there is no grower reaction or field problem in regard to the service. At present, it is a little early to gage accurately the merchandising advantages and disadvantages. In general, the company packs all grades provided for in the standards, but has found that the trade has been more interested in the development of Grade A than Grade B or C. One indication that the U.S. grade labeling has definite trade appeal is seen in the fact that new buyers are expressing interest in the whole line rather than in individual items. The service naturally tends to make the pack more uniform. That this fact is recognized by buyers is indicated by a notable decrease in the demand for samples. A large percentage of the company's business is still under buyer's label, but seller's label business has already increased materially under the service.

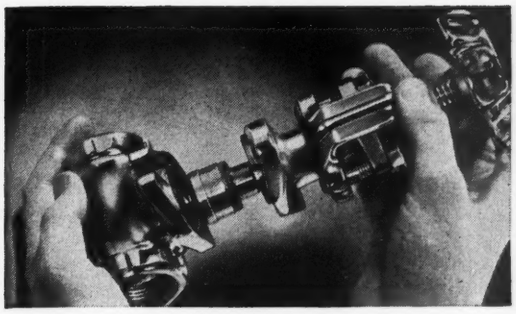
So far the company has put no advertising emphasis on grade labeling. In connection with "Rancho" soups, however, the inspection service feature was heavily advertised by newspaper, magazine and radio. Consumers seemed favorably impressed. Although no specific mention was made in this campaign on grading, many inquiries were received asking where products with grades on the labels could be obtained.



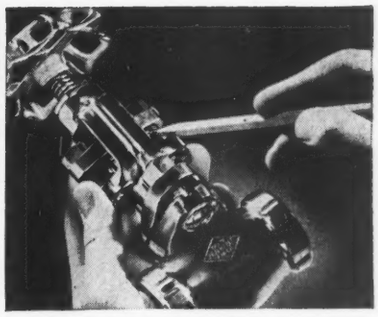
AMS inspector in action in one of the plants using the service. He cuts, scores and certifies the grade the morning after the products are packed.



1 Start with the perfect-grip, non-heat handwheel. The ingenious deep scallop design affords a firm grip—even for greasy hands.



2 Note how easily the Yoke-Bonnet is removed simply by loosening two clipped-head bolts. Also, the male-and-female joint with the body that prevents gasket from blowing out.



3 Look at that husky Yoke-Bonnet, spaciously built for free access to the packing box. Note the crown bearing of the Gland Flange that insures tightness without excessive effort on the nuts.

See how much More

this Stainless Steel Valve gives you!

You'll find every feature you need to keep liquids free from contamination, to promote sanitation, to simplify cleaning, to save maintenance—in this O.S.&Y. Globe Valve—JENKINS FIG. 1313

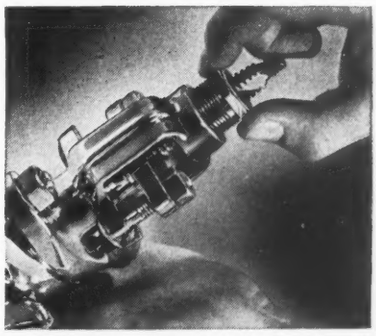
Here are some convincing facts you should have before buying Stainless Steel Valves. The photos spotlight a few extra service and convenience features of Jenkins Fig. 1313 . . . but for a thorough analysis, consult the enlarged section view that tells the inside story of Jenkins improved design and construction.

For example—beveled crown of the heavy duty spindle seats firmly in the bonnet for repacking under pressure when valve is fully open. Notice how the bevel type disc face parallels and equals that of the seat—assuring a permanently constant contact area and tight closure. Also the generous proportions of the body and its integral seat; no threads in the flow to disintegrate.

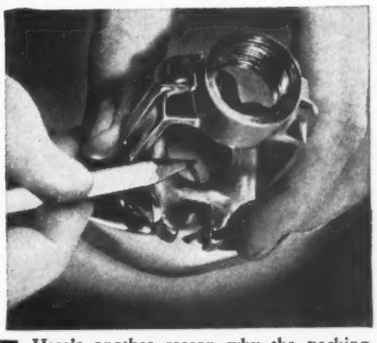
These Stainless Steel Valves are available in a wide range of sizes. Incidentally, we have one valve small enough for your watch chain. If you will send your name and address on a post card to Dept. T, 80 White St., New York, N.Y., we will send you free this gold plated valve charm.

You will find *every* feature of proved worth incorporated in Jenkins Stainless Steel Valves. Seven basic designs and a selection of alloys give you widest latitude in specifying the correct valves for your service. Start getting Jenkins Stainless Steel Valve safety and economy now.

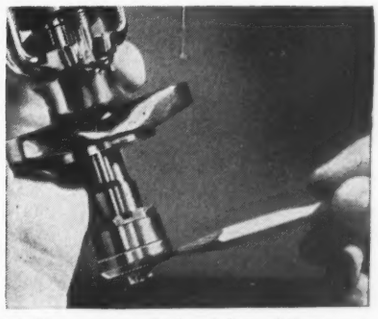
JENKINS BROS., BRIDGEPORT, CONN.



4 Unscrew the deep Yoke-Sleeve—that affords full length engagement with the spindle—and see how easily it can be replaced when worn.



5 Here's another reason why the packing gland works so well—an extra deep packing box that holds plenty of long-life African Blue asbestos packing.



6 Here you see the bevel face of the renewable Disc—perfectly matched to the seat and self-adjusted to it by the crowned spindle end.

LOOK TO Jenkins FOR THE BEST IN VALVE DESIGN

What's Behind U. S. Inspection And What It Involves

History of grade labeling—Consumer movement—Previous experience with Federal inspection—A, B, C vs. U.S. Grades—Required plant conditions—Plant sanitation—Processing and equipment—Labels—Costs—Buyers' attitude—Getting ready

By IVAN C. MILLER, *Distribution Editor,* FOOD INDUSTRIES

THE canning industry as a whole has always disapproved of compulsory grade labeling of canned foods. The canning industry has met every attempt to legislate compulsory grading with a solid front. The industry has attempted to satisfy the desires of consumer groups demanding A, B, C grading by embracing the descriptive label. Consumer groups as a body, however, have never abandoned the hope of ABC grading.

The stalemate lasted until June 30, 1939, when the United States Department of Agriculture moved a pawn.

An act of Congress disturbed the equilibrium. This act approved rules and regulations governing grading and certification of canned fruits and vegetables, providing also for the certification of U.S. grades under continuous inspection by the Agricultural Marketing Service, including designations on the label.

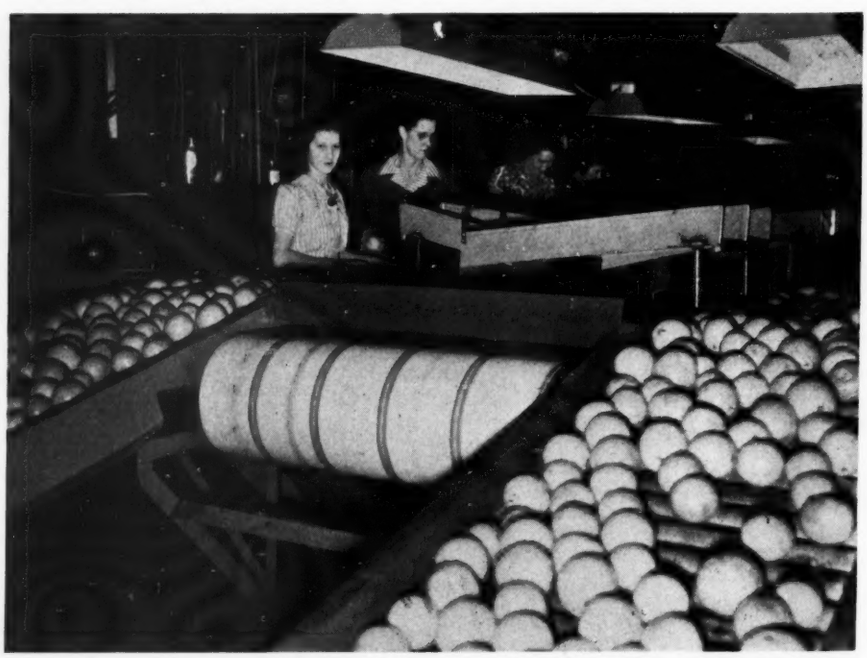
The act, as it pertains to canned fruits and vegetables, reads, in part:

"The act . . . for enabling the Secretary of Agriculture independently and in cooperation with other branches of the government, state agencies, purchasing and consuming organizations . . . to investigate and certify to shippers and other interested parties the class, quality and condition of . . . fruits and vegetables whether raw, dried or canned . . . when offered for interstate shipment . . . under such rules and regulations as may be prescribed, including payment of such fees as will be reasonable and as nearly as may be to cover the cost of the service rendered: *Provided,* that certificates issued by the authorized agents of the department shall be received in all courts of the United States as *prima facie* evidence of the truth of the statement therein contained . . . Charges for continuous factory inspection and grading may be made on such contract basis as will reimburse the Agricultural Marketing Service for the salary and all expenses of the factory inspector and fees of official grader, to which shall be added an appropriate percent of charges assessed to cover as nearly as practicable administrative overhead expenses."

This act, which transfers to AMS an authority long invested in the Bureau of Agricultural Economics, includes provisions for factory inspection and U.S. grading—*on a voluntary basis*—and label designation of U.S. grade.

One canner immediately applied for the service for the 1939 season. Five other canners operated under AMS continuous inspection and U.S. grading during the following season. During 1941 at least 17 canning plants in 11 states will operate under AMS.

The canning industry, and other food industries as well, have faced many changes in recent years. However, nothing which has happened in the history of the industry has been of more signific-



Fluorescent lighting is general over inspection belts in Florida citrus fruit packing plants, all of which are subject to Federal-State inspection and grading. Fluorescent lighting is just beginning to be adopted in Florida citrus canning plants.

All women employees packing grapefruit segments in this Florida plant under AMS inspection and grading wear uniforms. According to the management, the presence of AMS inspectors in the plant has had a stimulating effect on efficiency and employee morale.

ance to the whole canning industry, and to the whole food industry for that matter, than the recent development in voluntary plant inspection and certification of U.S. grades by AMS.

For this reason FOOD INDUSTRIES has endeavored to assemble all available facts regarding this development and also the opinions and thinking of canners who have operated under the voluntary system, as well as of many competitors who have not. An editor visited Florida citrus canning plants in operation under AMS and also other citrus plants not under AMS. The purpose was to obtain the thinking of citrus canners whose products were processed under AMS inspection and also the views of canners not using the service.

In this article is given the combined thinking of those canners.

Background for Canners' Thinking

Throughout recent years the food industries have faced the probability of compulsory regulation. The failure of the "Tugwell Bill" (S. 1944) to be enacted into law removed the first real attempt at compulsory grade labeling. Its legislative demise did not, however, remove the sword which has ever since been hanging over the industry.

The Tugwell Bill would not have been proposed except for the backing of important organized groups which had demanded many of the regulations proposed in the bill. Neither would NRA have attempted to force ABC labels on the industry except for this fact. These organized groups (among them American Home Economics Association, American Association of University of Women, and League of Women Voters) which have fostered what is now known as the "consumer movement" have insisted an A, B, C grading and labeling of canned foods.

The consumer movement, only recently so named, had its birth in organized form more than 20 years ago when the American Home Economists Association proposed including "consumer education" in school curricula. The extent to which consumer education is now being taught in primary and secondary schools and colleges cannot fail to influence materially the thinking of the coming generation.

The demand for compulsory A, B, C grade labels has been a plank in the organized consumer's platform throughout most of the existence of the consumer movement. The movement's enrollment has enlarged. Its demand is still for grade labels.

It is any wonder, in view of all this, that many of the canners who have voluntarily embraced AMS inspection and grading have stated, as one of their reasons, that they saw "hand-writing on the wall"?

In spite of the fact that most of the canners interviewed had seen the handwriting on the wall which foreshadowed regulation of the industry, compulsory if not voluntary, most canners not now under AMS stated a strong objection to any A, B, C grades on their labels. All but a very small portion of those interviewed did agree however that Federal inspection in plants —all canning plants—might be advantageous to the industry as a whole.

Some of the canners who objected to A, B, C grading and the statement of A, B, C grades on the labels gave as

Incoming fruit must meet the approval of inspectors in plants under AMS. Checks on the quality are made regularly.

Cleaning and Sanitizing in Food Plants

Canneries to profit by adopting sanitary practices which have proven successful in the milk industry.

By STELLA M. COSTIGAN—*Bacteriologist, Research and Development Division, Pennsylvania Salt Manufacturing Company*

QUALITY CONTROL of food products has received considerable attention in recent years. Each year brings more products under the control and guidance of trained food technologists. We have only to look to the milk industry to see how it has benefited from extensive technical control. In fact, it has become the shining light of what adequate control can do and something for the food processor to use as a model. An understanding and appreciation of what is necessary to produce good milk has been the means of elevating milk and milk products from what was often a medium for the transmission of disease organisms to a food which, in most every community, can be considered safe and of good quality. Technical control has also resulted in greater returns to the producer.

The main reason for bringing about this change has been the demand for high-quality products which has helped protect the processor's market. This could only be accomplished in the milk industry by the most up-to-date and improved sanitary procedures. Fundamental knowledge of the problems at hand, coupled with proper equipment, cleaners and efficient sanitizing agents have overcome even those situations which seemed stubborn and uncontrollable. Of all these things, probably the most important are cleaners and sanitizing agents, irrespective of the types of equipment used.

TECHNICAL CONTROL THE SAFEGUARD

Efficient cleaners and sanitizing agents have just as definite a place in the canning industry as in the milk industry. Inspection in all food processing should follow the product in question from its source to the consumer package. This means that the product during its entire processing must be free from infection and contamination. We may define infection as "the presence of undesirable viable micro-organisms which have entered into the food from some source during production or handling, and proliferate to spoil the food or make it dangerous to health. Contamination on the other hand is the presence of any undesirable substance, organic or inorganic, viable or inert, which is foreign to natural food."*

Micro-organisms, which cause spoilage in food or which may be disease producing, may contaminate the food at the source of production or during processing by contact with infected surfaces, such as containers and equipment, and even food handlers. Hence as in the production of milk and milk products precautions must be taken in food processing to prevent contamination.

*Food Control—James H. Shrader, page 3.

PLANNING TO APPLY FOR A.M.S. INSPECTION?

Canners who are planning to apply for the inspection seal of the Agricultural Marketing Service of the United States Department of Agriculture will find in this article practical steps to aid in improving plant and equipment sanitation.

Author

As stated previously, the cleaning and sanitization of equipment are essential in the prevention of contamination. Sanitation in the canning plant means physical cleaning followed by an effective method of sanitization.

CLEANING COMES FIRST

Efficient cleaners and sanitizing agents have a great many duties to perform. Among these are sanitization of walls, floors, and equipment. They must be able to clean effectively with the least amount of effort and time. They must not injure the surfaces to be cleaned and further must not irritate the hands of the workers. It is, therefore, essential that the products used for cleaning and sanitizing be chosen for their ability to perform their many duties easily and efficiently. B-K General Cleanser is one that can be recommended for use in any food processing plant.

Where vegetables, fruits, and juices are being canned, containers, picking tables or conveyors, vats, blanchers, pasteurizers for juices and fillers readily become covered with the juices or fragments of the products being processed. Whenever processing is interrupted, the machinery must be stopped and *all parts must be thoroughly cleaned.* During this procedure any products left on the equipment provide ideal growth conditions for micro-organisms which cause spoilage.

EQUIPMENT MUST BE SANITIZED

Although this equipment is thoroughly cleaned, it still is not in a sanitary condition. From its general appearance no visible dirt can be detected but micro-organisms may still be present and should be destroyed. An efficient sanitizing agent which will aid in freeing the surfaces of micro-organisms should be employed. As time is a vital factor and, further, costs cannot be overlooked, care must be taken in selecting a sanitizing agent for this task. From this it is evident that more than one factor must be considered in selecting an efficient sanitizing agent and the food processor should be alive to the importance of:—

1. quick germicidal action at low concentrations
2. corrosion effects (a product which corrodes leads to equipment injury and possible dangerous scale and metal contamination)
3. production of off flavors, through direct action of the sanitizing agent on the food being processed or indirectly imparting flavors in its own right or through secondary reactions.

HYPOCHLORITE SANITIZATION IS EFFICIENT AND INEXPENSIVE

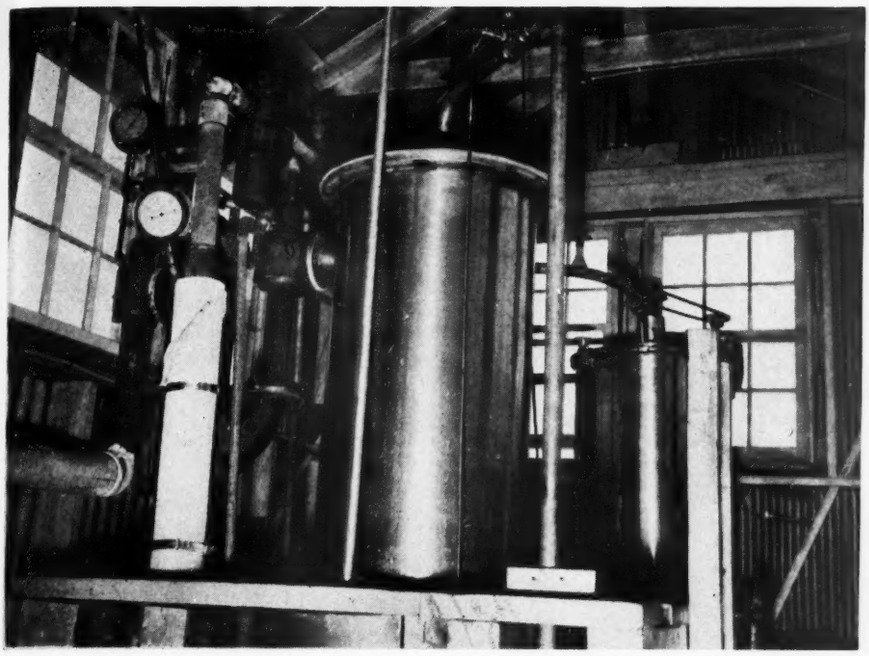
A product which meets these requirements is Perchloron, a calcium hypochlorite powder, which has an available chlorine concentration of over 70%. This product is economical to use, as one-half teaspoon to 1½ gallons of water prepares a 200 part per million available chlorine solution which will effectively sanitize containers, conveyors, picking tables, vats, blanchers, pasteurizers and fillers.

The subject of Improved Sanitation in the food plant cannot be dismissed until a word is said about waste products. Fluid waste in canneries has been a problem in that drains may become offensive. The concentration of Perchloron for spraying walls and floors after they have been cleaned, namely 1,000 parts of available chlorine per million parts of water, if used to flush drains will greatly aid in deodorizing them and will assist in removing sources of contamination.

Improved sanitation means improved quality which cannot be attained unless efficient "tools" are used and actual experience has proven the efficacy of B-K General Cleanser and Perchloron in connection with measures which are so vital to public health.

The manufacturer of these products, the Pennsylvania Salt Manufacturing Company has a staff of research chemists and technicians who are at the service of the canning industry and other food industries to help work out these sanitization problems. They will be glad to give careful consideration to any such problems presented to them. Address the Author, care of Pennsylvania Salt Manufacturing Co., Research Laboratories, 1000 Widener Building, Philadelphia, Pa.

(ADVERTISEMENT)



Deaerating citrus juices prior to pasteurizing saves vitamin C in this AMS inspected plant.

the basis of their objection the fact that they considered present standards imperfect and methods of checking on products to determine the grade inadequate. Nevertheless, even some of these canners agreed that if their products, along with the products of all their competitors, were graded, they could see no great disadvantage, though they could see no material advantage to themselves or consumers. This latter was the thinking of only a minority of the canners interviewed.

All but a very few of the canners did agree, however, that if factory inspection were general it should benefit the industry. To substantiate their statement these canners pointed out the following:

The meat packing industry has for many years been subject to compulsory inspection under BAI. This industry, including canners of meat products, has found inspection by BAI advantageous. It would not willingly relinquish the service. Canners further point out that food processed under BAI is not subject to the same embarrassment and losses through Food and Drug seizure and condemnation which harasses processors of uninspected foods. Of course, the Food and Drug Administration is an enforcement agency, with the responsibility of protecting public health and safety. If food inspected and passed by BAI should, as the result of floods, fires and other "acts of God," become unfit for human consumption, it then becomes the responsibility of the Food and Drug Administration to remove such products from the channels of trade.

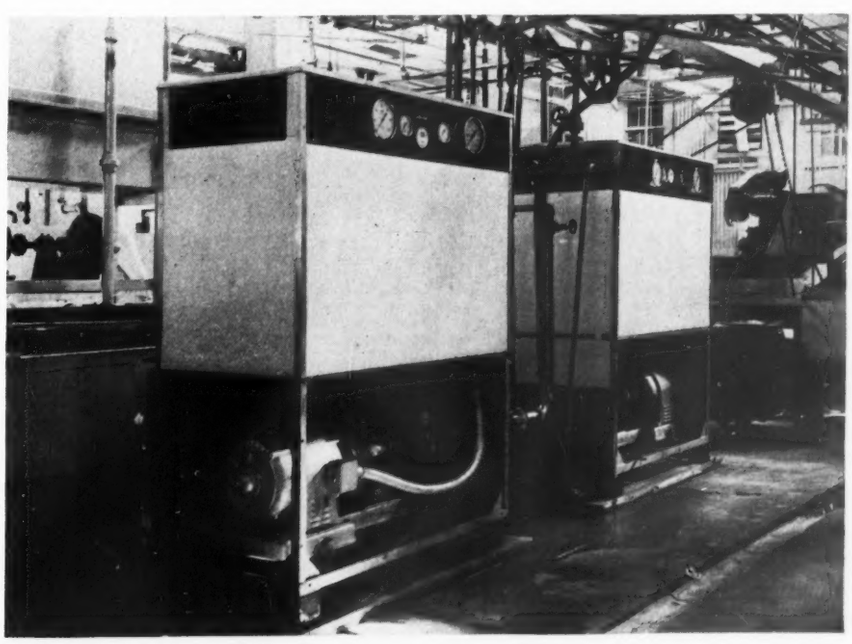
Canners who contend that Federal inspection might prove advantageous if adopted by the whole industry also point out the experience of shrimp canners under the Seafood Amendment of the food and drug law. The results obtained under this amendment are best set forth by quoting from reports of the Chief of the Food and Drug Administration for the year 1935.

"Reference has already been made to the enactment late in the last fiscal year of the so-called 'Seafood Amendment' to the food and drug act. This amendment, which was sponsored by the shrimp canners, authorizes the Secretary of Agriculture on application of any packer of seafoods shipped in interstate commerce to assign inspectors to the applicant's establishment to supervise packing operations. The packer is required to bear the cost of inspection and the necessary cost of administration.

"The first service under this amendment was inaugurated in three canneries in Biloxi, Miss., in September, 1934. The service was installed in seven additional plants the following month. Further applications were made from time to time through the year, until a total of twenty-two plants received the service in Georgia, Alabama, Mississippi, Louisiana and Texas . . .

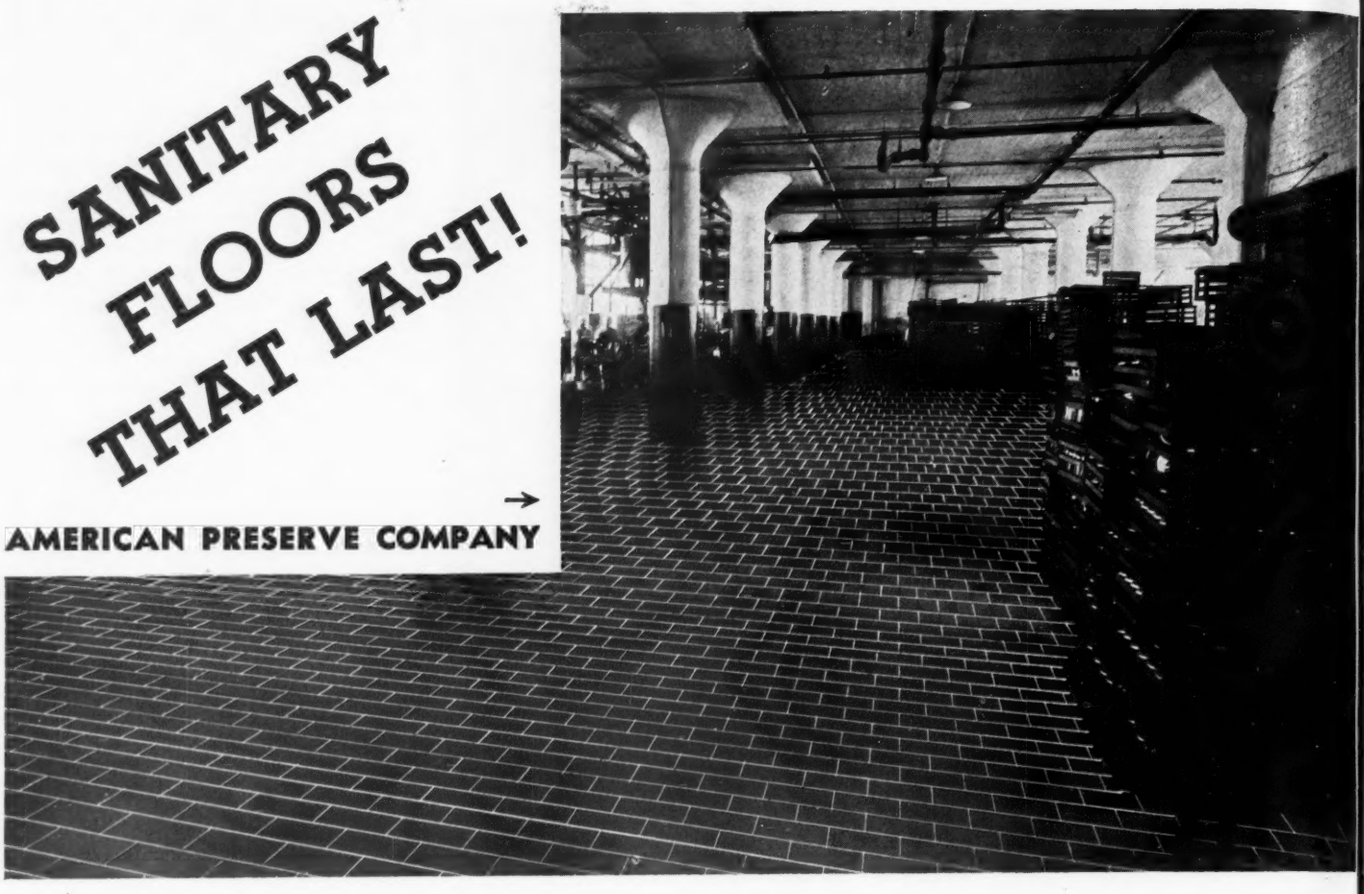
"Because the heaviest packing season had passed before the service was inaugurated in most of the plants under inspection, only about one-third of the total pack of last season was put up under inspection . . . Because a large portion of last year's pack was not under this inspection it was necessary to continue the regulatory surveillance of the uninspected product . . . Samples representing the output of seventy manufacturers were collected and examined. Eighty-nine seizures of canned shrimp were accomplished . . .

"While every precaution has been observed to avoid even the appearance of 'selling' the service to the packers,



Two flash pasteurizers installed during the current operating season in the Florida Fruit Canners plant, Frostproof. These pasteurizers raise the temperature of citrus fruits as high as 300 deg. F. in two seconds, then lower the temperature to below 190 deg. F. in the next two seconds.

SANITARY FLOORS THAT LAST!



→ AMERICAN PRESERVE COMPANY

Sanitary Floors that Last:

Are your floors splintered, rutted, pitted? Does heavy trucking cause high annual maintenance charges? Is it difficult to obtain and maintain proper cleanliness? *Drehmann Better Floors are the answer to these and other flooring problems.*

These Better Floors can be laid over old floors, quickly, with no loss in production time. They are durable, long-wearing, *life-time* floors that will stand hard service and heavy trucking—hard, smooth, non-absorbent, splinter-proof and chip-proof floors that are easily kept clean and cost little or nothing for maintenance.

We've installed Drehmann Floor Brick that has now been down twenty years or more, in packing and dairy plants, bakeries and canneries—and in many instances not a single dollar has ever been spent for repairs.

End your floor troubles—our engineers can show you how—will be glad to consult with you, without obligation.

Write for our illustrated booklet "Better Floors".

DREHMANN
PAVING & CONSTRUCTION CO.

TIOGA & GAUL STS., PHILADELPHIA, PA.

since it was obviously the intent of Congress that it be purely voluntary, it appears from a large number of new applications received for the service at the beginning of the packing season in August that the bulk of the canned shrimp packed during the current fiscal year will be under inspection.

"The seafood inspection service represents a distinct innovation in Federal food law enforcement in that the food manufacturer pays the cost of inspection and is free to accept it or reject it as he wishes. The service corrects potential violations at their source, as does the Federal Meat Inspection Act of 1906, but that act is mandatory.

"While the seafood amendment does not render inoperative the provisions of the law for criminal prosecution and seizure action on immediate shipments of violative goods, a compliance with the regulations promulgated under the amendment insures the integrity of the product and thus renders the remedial provisions of the act unnecessary. Not only is this advantageous to the packer, but the consumer is more effectively guaranteed a sanitary, safe and wholesome product than can possibly be assured through the enforcement of the other provisions of the act."

The 1936 report of the Chief of the Food and Drug Administration had this to add to the comments in the 1935 report:

"Because canned shrimp put up under the rigid inspection requirements is entirely wholesome and complies in all respects with the law, there is no occasion for seizure or other legal action against shipment of the inspected product. Canners making use of the inspection service have therefore been relieved of the expense and embarrassment of legal action with which they found themselves too frequently confronted before the service was available. Although extensive changes in plant equipment and operation were required, the assurance of wholesomeness and legality conveyed by the service has resulted in an increased demand from both distributors and consumers that more than compensate for the cost involved. At the close of the packing season in June, despite the fact that one of the largest packs in history had been put up, the canners' warehouses were practically bare of stock. Applications for the resumption of the service at the beginning of the packing season of the fiscal year 1937 indicate that all but a negligible amount of the canned shrimp put up during the year will be under inspection."

It should be noted at this point that the initial cost of the inspection service of Food and Drug Administration to shrimp canners was 1/4 cent per can of shrimp. This cost has since been reduced to 1/5 cent per can of shrimp. The cost of inspection varies roughly inversely with the volume of production. The average production of a shrimp canning plant is less than 20,000 cases per year.

A, B, C Labels and U.S. Grade Labels

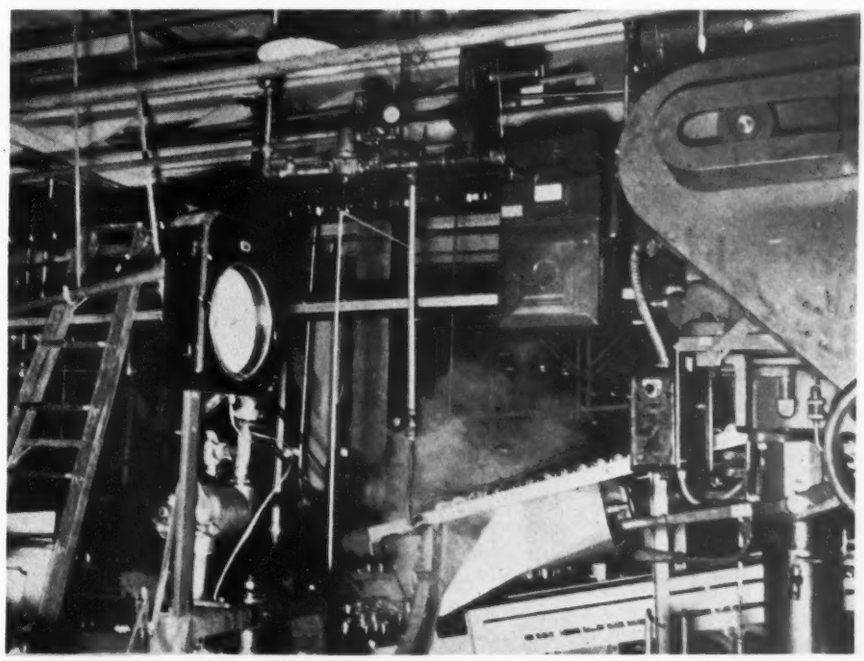
In the past, F&DA has been concerned with violations of the law which pertained to "adulteration" and "decomposition" of canned foods and with short weight, slack fill and other fraudulent" statements on the label. Up until now F&DA has apparently ignored grade statements on labels of those canned foods for which standards have been established. Many canners have intimated they believe there may be a day of reckoning for label statements in terms of plain A, B, and C, and probably also Fancy, Choice and Standard.

Tide (April, 1941, issue) throws some light on this situation, quoting a bulletin by Wallace Werble:

"Although Food and Drug Administration officials say they are in favor of anything that promotes discriminating buying on the part of consumers, they are frank to admit that recent developments in the field of grade labeling have imposed a difficult enforcement problem on their shoulders. While reluctant to criticize government and private agencies promoting grade labeling, Food and Drug officials point out that the use of grade designations on the label means that the Administration will have to take steps to see that a product conforms to a grade designation on its label—in short, the grade designation on the label will be subject to the same test of truthfulness that is applied to any other statement on the label of any food product."

Tide continues:

"Intrigued by this unofficial admission that grade labeling could be a misbranding problem of considerable proportion, *Tide* last fortnight purchased in retail stores 60 cans of tomatoes, beets, corn, peas, peaches and grapefruit, whose labels were marked 'A', and 12 cans of tomatoes and corn marked 'B'. It then stripped the labels and had them graded by the graders of the U.S. Agricultural Marketing Service in Washington, Chicago and New York. *Tide* did not choose products packed under the continuous inspection service of the AMS for the reason that AMS inspectors mark the can ends under this process and the AMS will not regrade them. The results indicate some foundation for F&DA's suspicions. Of 60 cans labeled 'A' the graders found only 27 which came up to Grade 'A' standards; 29 were found to be Grade 'B' and four were rated as low as 'C'. The 12 cans labeled Grade 'B' came out much better. Nine of them were found by the graders to be Grade 'B' in fact, and three came out Grade 'A'."

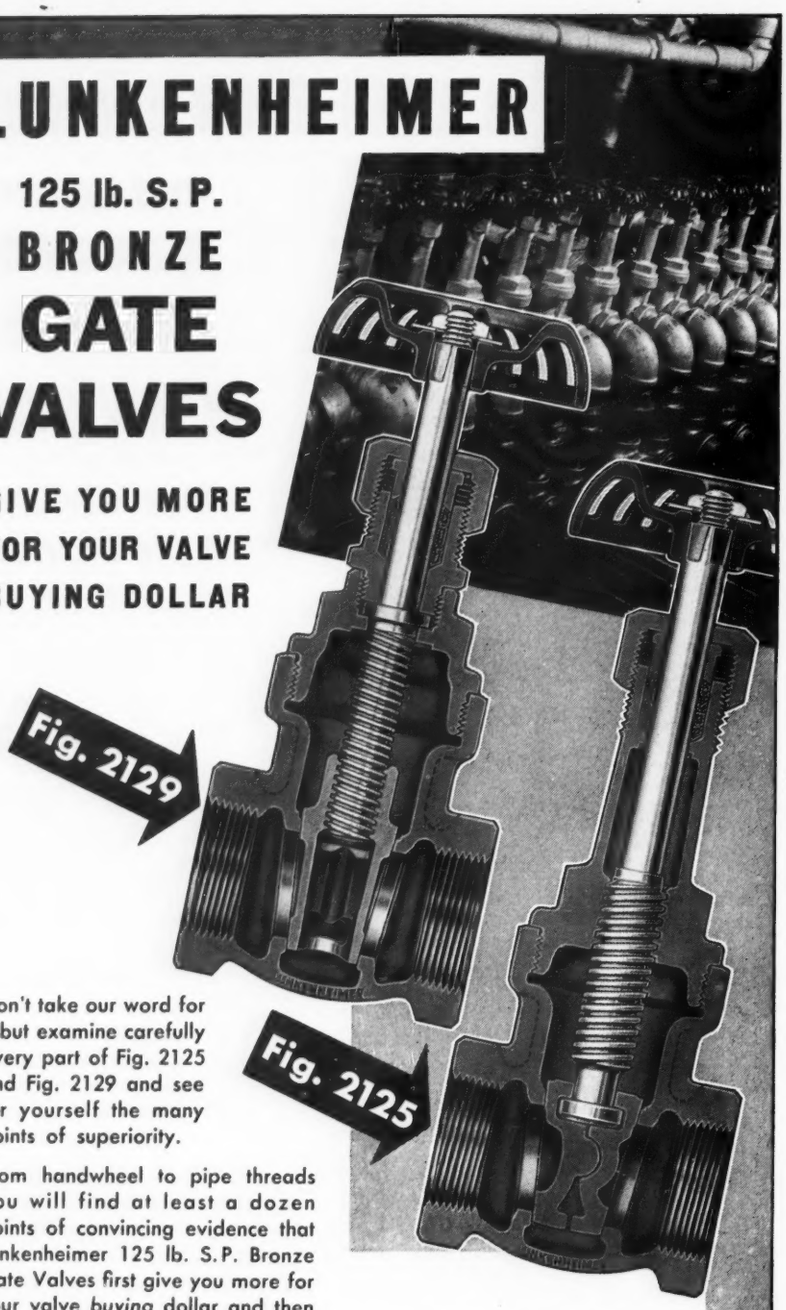


Recording and controlling instruments and meter for control of inert gas used in canning. Several Florida plants pack in an atmosphere of inert gas, as does this one under AMS.

LUNKENHEIMER

125 lb. S. P. BRONZE GATE VALVES

GIVE YOU MORE FOR YOUR VALVE BUYING DOLLAR



Don't take our word for it but examine carefully every part of Fig. 2125 and Fig. 2129 and see for yourself the many points of superiority.

From handwheel to pipe threads you will find at least a dozen points of convincing evidence that Lunkenheimer 125 lb. S.P. Bronze Gate Valves first give you more for your valve *buying* dollar and then save you more on your valve *maintenance* dollar. Such features as unusually heavy body and bonnet construction, more powerful and accurately machined stem threads, exceptionally sturdy bonnet collar, extra deep stuffing boxes — all combine to guard against failure.

Judge for yourself whether these features mean substantially greater values. You owe it to the profit side of your ledger to investigate.

Available from Lunkenheimer distributors in all industrial centers. Ask for your copy of Catalog No. 78.

ESTABLISHED 1862
THE LUNKENHEIMER CO.
"QUALITY"
CINCINNATI, OHIO, U. S. A.
NEW YORK CHICAGO
BOSTON PHILADELPHIA
EXPORT DEPT. 318-322 HUDSON ST., NEW YORK

LUNKENHEIMER

Probably as a result of Federal inspection and U.S. grading in a few canning plants, the National Association of Food Chains has recommended that its members adopt a grade labeling program. A number of corporate chains, including Kroger and Grand Union, are falling in line. A.&P. is extending the use of grade labels to all of its private brands for which standards have been established.

This trend has not passed unnoticed by canners. Many of them, not now under AMS, point out the provision in the act (which provides for plant inspection and grading by AMS) "that certificates issued by the authorized agents of the Department shall be received in all courts of the United States as *prima facie* evidence of the truth of the statements therein contained," and consider that this applies to AMS statements on the label. They also indicate F&DA's attitude toward its own inspection service in the shrimp industry, "because canned shrimp put up under the rigid inspection requirements is entirely wholesome and complies in all respects with the law there is no occasion for seizure or other legal action against shipments of the inspected products." These canners then reckon the cost of AMS inspection and grading and the possible cost of conditioning their plants for acceptance—and ponder.

Required Plant Conditions

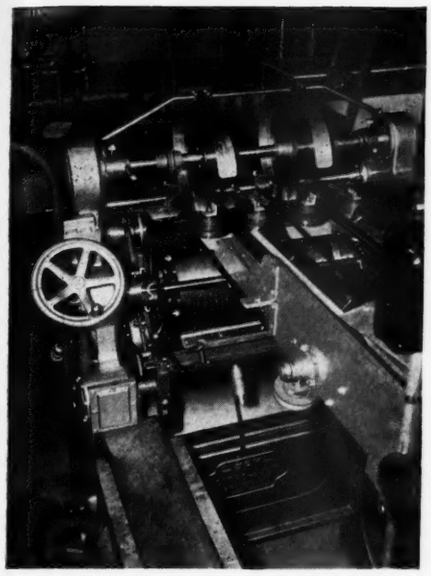
Some canners who look not unfavorably at AMS inspection and grading and who do not consider the costs of the service to be prohibitive, nevertheless hesitate at the initial cost—the cost which may result from changes necessary to put the plant in condition for acceptance by AMS for continuous inspection.

AMS insists on acceptable sanitation and continued "good housekeeping." The conditions of the plant satisfactory to acceptable sanitation and good housekeeping are not specified in any printed report. There are no detailed instructions or rules and regulations to guide the prospective applicant.

In the absence of definite instructions to guide canners, in estimating the cost of putting the plant in shape to qualify for AMS inspection, possibly the best guide, short of a plant visit from AMS, is a report on the conditions found in plants now operating under AMS.

Plant Sanitation

Floors in AMS plants were first put into condition to be easily kept clean and sterile. They are policed regularly. They must be washed at the end of each operation period. AMS does not specify the



This new juice extractor, the first of its kind in use in a Florida citrus cannery, was installed to reduce peel-oil content of the juice.

materials to be used, the method of washing to be employed nor the method of obtaining sterilization. AMS is concerned with the results which must meet its requirements. Equipment, too, must be washed at the end of every cycle—must be washed, kept clean and made sterile. How is less important than how well.

The use of paint was important in AMS inspected plants. In the two Florida plants under AMS every surface of the inside of buildings where food was processed was painted. One plant used white paint, the other aluminum. Interior paint is important not only from the standpoint of sanitation, but also efficiency. Interior paint reflects light, improves working conditions and increases efficiency. Adequate light is an aid to careful inspection.

The FOOD INDUSTRIES editor who visited citrus plants in Florida carried with him a light meter with which the amount of light on inspection belts and working spaces was measured. In the two plants under AMS light on the white rubber inspection belts and work tables registered 50 to 70 footcandles, adequate light for "average sewing" or "fine assembly," according to the legend on the meter. In other plants where meter readings were taken, the light at similar locations was frequently as low as 5 to 15 footcandles, suitable only for "rough work," according to the legend on the meter, and "inadequate for most tasks."

All the employees in one of the plants under AMS in Florida wear uniforms. Chemist, plant superintendent and foremen wear all-white uniforms. In the other plant all women wear uniforms, including white caps. The men wear white rubber aprons and white rubber boots. Uniforms, according to comments of those interviewed, stimulate personal cleanliness and also plant cleanliness, increase efficiency and employee morale.

Personal cleanliness, as it affects plant sanitation, is mandatory in plants under AMS. Medical examination is required. The only access to toilets is through washrooms. Employees must wash hands before entering as well as after leaving toilets. Fluid or cake soap and paper towels are provided. The average paper towel consumption per employee is between six and eight towels per day.

Processing and Equipment

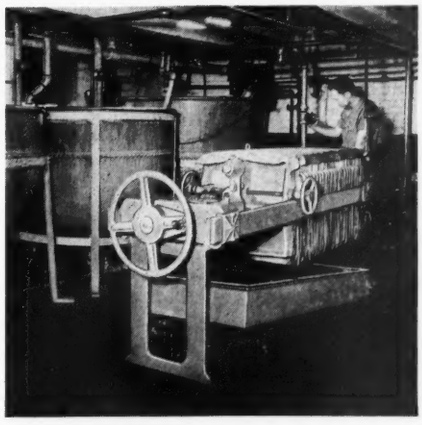
AMS inspects fruits and vegetables as they enter the plant, inspects foods in process and requires a high degree of sanitation and adequate sterilization or pasteurization. Then the AMS inspection grades and certifies the quality of the finished product; but AMS does not control nor interfere with the process itself. If equipment is sanitary and can be kept sanitary, AMS is not concerned. Equipment is the concern of the canner. On it he depends for the maximum preservation of the quality inherent in the incoming fruits and vegetables. AMS is the judge of the quality. The process, the equipment and the efficiency of operation must provide adequate quality control.

One of the usual arguments which has been advanced against compulsory grade labeling is that grade labeling will freeze quality at a low level and also remove the initiative for technical advances in the industry. What the results would be were the entire industry under compulsory grading can only be conjectured. The six canning plants which have processed foods under AMS continuous inspection and U. S. grading have voluntarily applied for and accepted the service. However, the attitude of these canners does indicate what may be the future attitude of other canners processing under AMS inspection toward maintaining high quality and toward technical advancement in the industry.

One of the Florida citrus canners under AMS maintains control over the quality of citrus juices by tests made in each 15-minute interval and over each 150 gal. processed. One of the few Florida citrus canners to deaerate its juices, in order to minimize peel-oil oxidation and consequent rancidity, was one of the plants under AMS. This

CONTROL FILTRATION QUALITY

ASSURE SANITATION



Shriver Aluminum Filter installation for maple syrup. Many such units of stainless steel, bronze, rubber, etc., filter citrus and other fruit juices, cider, vinegar, extracts, honey, liquors, etc. And their number grows as processing standards go up!

Shriver Filters assure you not only of high flow rates of filtered products, perfect clarity and purity that meet the highest quality standards but also of sanitary processing and easy cleaning.

NON-CORROSIVE CONSTRUCTION

Use of stainless steel, aluminum, or other sanitary metal or material eliminates corrosion or contamination, whether the filter is operated hot or cold.

EASY TO CLEAN

Shriver Filters can be washed down or steamed out in minimum time.

Built in any size for use with or without filter aids or decolorizers, simple to operate at mighty low filtration cost.

Get the whole story in Bulletin #110.

T. SHRIVER & COMPANY

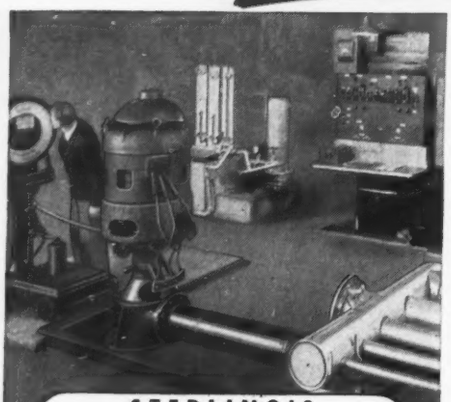
860 Hamilton St., Harrison, N. J.

FOR BETTER QUALITY

Shriver FILTERS

RECOVER SOLIDS · CLARIFY · DECOLORIZE

That You May Be... SURE!



STERLING'S PUMP TESTING LABORATORY

YOU don't have to guess or hope that the pump you buy will do the job required of it—if you buy a Sterling. That's because Sterling pumps must prove themselves in the Sterling laboratory.

In this completely equipped modern laboratory, pumps are tested for efficiency under *exact* operating conditions. Even electrical current peculiarities are carefully duplicated by our own motor generator set, in order that actual pump capacities (from 1 GPM to 12,000 GPM) may be accurately recorded at the motor speeds you will use.

Write today for complete information about Sterling Pumps—you'll see for yourself why it is said that "Sterling more than lives up to its promises."

Sterling PUMPS

STERLING PUMP CORP.
Hamilton, Ohio Stockton, Calif.

METSO "Clean-up" is EASIER

Floors look like new after a Metso scrubbing. Besides, Metso takes less elbow grease because it gets down into the pores and almost literally pulls the oil and dirt to the surface.

Use Metso for all general clean-up of equipment and utensils. Its balanced ingredients remove dirt and grease quickly, and at the same time protect sensitive metals.

Unvarying uniform quality insures the same efficient results every day. Order a 100 lb. bag or drum for a trial, and note the difference in appearance, in shortened clean-up time and in cost. Metso is economically priced as a basic alkali.

PHILADELPHIA QUARTZ CO.
General Offices and Laboratory: 125 S. Third Street, Philadelphia, Pa.
Chicago Sales Office: 205 W. Wacker Dr.
Convenient Stocks in over 60 cities
Established 1831

METSO CLEANERS

plant was also one of the few plants canning juice in an atmosphere of inert gas. It was the only plant visited in Florida employing homogenizers as a part of the juice-canning process.

Since the citrus canning season opened this year, one of the plants under AMS has installed two new types of equipment, the only such installations in Florida. One is a new type juice extractor with which to reduce the peel-oil content of the juice; the other a flash pasteurizer which raises the temperature of the juice to 300 deg. F. in 2 seconds and lowers it to 190 deg. F. or below in another 2 seconds, making a 4-second cycle. This pasteurizer, according to the owners, promises to impart less pasteurized flavor to the juices than other types of pasteurizers.

The two canning plants under AMS in Florida are primarily interested in building acceptance for their own brands. Apparently they endeavor to produce the best possible quality rather than the minimum tolerated (this was verified by the AMS inspectors in each plant), and also they are attempting to improve technology to accomplish improved quality. This contradicts the old argument to the contrary.

Label Designation Optional

When a canning plant operates under AMS, all products produced in that plant under the continuous inspection of AMS are packed in cans, on one end of which is embossed the U.S. shield, or in glass with the shield molded in the bottom of the container. All canned foods produced under AMS continuous inspection are thus identified. Once graded they are not subject to future grading by AMS.

All statements on the labels of such canned foods produced under AMS must be in conformity with the statements of the AMS certificate of the lot. Such statements on the labels of canned foods in containers embossed with the shield, or with the shield molded in the bottom, "shall be received in all courts of the United States as *prima facie* evidence of the truth of the statement . . . "

While all foods processed under AMS continuous inspection must carry the shield, embossed or molded in the container, no reference to AMS need be made on the label. No grade need appear on the label. No declaration of continuous plant inspection is necessary. The label of a food canned under AMS continuous inspection need be in no way different from any other label. Whether or not the label shall carry the inspection shield is optional with the canner or his buyers.

White rubber conveyor belts are used in this AMS plant for foods traveling past inspection points. The company inspector is in an all-white uniform. The light-meter reading at point of inspection is 50 footcandles.

Cost of AMS to Canners

The provisions for AMS continuous inspection and grading service require that canners assume the entire cost. This includes reimbursing the Agricultural Marketing Service for the salaries of factory inspectors and graders, plus 25 percent to cover administrative overhead expenses. Obviously the gross cost per case will vary inversely to the size of the pack. Canners who have used the service report a gross cost varying between ¼ of one cent and 1/3 of one cent per case of 24 No. 2's.

There is no adequate means of judging the cost of putting the plant in condition acceptable to AMS. This will depend on the condition of the plant.

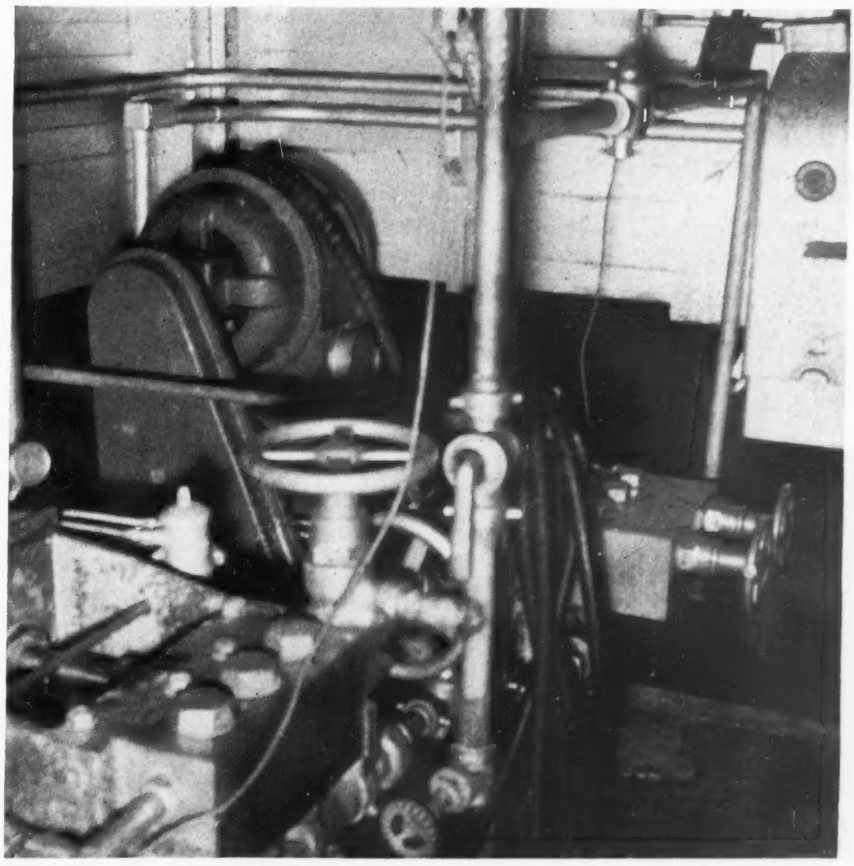
Buyers' Attitude

Though a part of the pack of the six canners who have used AMS goes out under buyers' labels, all of them, when they applied for AMS inspection and grading, believed the shields on the labels would strengthen the acceptance for their own brands. Several of these canners maintained that there is already ample evidence to indicate that the two shields do aid materially in building acceptance among consumers and among some buyers for the canners' own brands.

They also point out that until many more canners are processing under AMS, buyers' labels carrying AMS shields of inspection and grading are at a disadvantage. Several canners point out from their own experience evidence of this disadvantage. Buyers distributing under their own labels, though they insist on the AMS certificate which certifies the U.S. grade and continuous inspection of the product during processing in the plant, refuse to have either shields appear on their own labels (one canner will add the shields to buyers' labels in his own plant).

The reason for this attitude of private-label buyers is that the available supply of AMS inspected and U.S. graded canned foods is at present limited. Ample replacements cannot be assured. If a buyer offers a single item in his canned food line, or even several, with AMS shields on the labels, he may well expect to face the embarrassing question: "Why not government inspection and U. S. grades on all other labels?"

It is the belief of most of the canners now operating under AMS that the government shields on the labels are at present most advantageous in improving the acceptance and increasing the sales volume of the canner's own brand. They believe, however, that the shields will also greatly increase consumer acceptance of any canned food whether it be a canner's brand or a buyer's brand. There are important exceptions to the general attitude of many buyers which should be noted. Typical is the experience of C. D. Kenny Co., Baltimore, Md. This company is adding to its canned foods line all varieties of foods packed under AMS as rapidly as possible. C. D. Kenny Co.'s experience with AMS shields on its own labels indicates that



Homogenizers and sanitary piping are used in this plant which cans citrus juices under AMS inspection.

Here's a 3-minute "Commercial" concerning your future . . .

Agricultural Marketing Service

The A.M.S. program of Continuous Inspection and Grade Certification has added new significance to the Function of Control of Quality in Food Manufacturing. It means that the federal government is now taking an active interest in seeing that Control of Quality really functions *according to recognized standards.*

In this outline of A.M.S. procedure, FOOD INDUSTRIES believes it has a document of vital interest to the whole Food Field.

The significance of this development—*to you Mr. Food Manufacturer*—is the indicated probable expansion of federal government inspection and grading to every branch of the food field—wherever food and drink are prepared for human consumption.

Coming events cast their shadow and it is a wise food manufacturer who keeps himself posted on what is happening in other parts of the food industries today and how it will be affecting his industry tomorrow.

Don't wait until the mail man brings a letter reporting that A.M.S. inspection, vitamin fortification, quick freezing, vacuum packing, or a hundred other important developments have suddenly taken hold in your particular branch of the food field and all your smart competitors have already gone in for it with a bang. Get up in the smart class yourself—analyze these things as they come along and be among the leaders—not the followers—in your industry. *Be in a position to turn these advance notices of trends to your own advantage!*

This report on A.M.S. procedure is an example of how FOOD INDUSTRIES keeps alert food manufacturers *authoritatively* informed on the important developments in the Food Field. Right now it is of paramount importance to Canners (read the details and you'll see why in the next year or so it will become absolutely vital to the very existence of many canning companies). But it is important, too, to every other manufacturer in the Food Field because it is the pattern of a trend which may eventually be just as vital to the Bottler, the Baker, and the Candystick Maker.

The pace today is too fast for food manufacturers to sit back and wait to see what the other boys in their group are going to do. The man who reads only his own vertical industry paper, is automatically limiting himself, on a competitive basis, to the level of the rank and file of his own industry. He doesn't know any more about what is around the corner in some other branch of the food field than anybody else in his industry, and is no better prepared.

The man who reads his industry paper *and* FOOD INDUSTRIES is *one jump ahead of the parade* and ready to cash in on developments which mean *profits* to those who get there first, but only *headaches* to those who have to follow or drop out of the race entirely.

Vitamin Fortification

The June issue of FOOD INDUSTRIES will carry another complete and authoritative report, similar to this one on A.M.S., devoted to the subject of Vitamin Fortification. This report will not only cover the theory involved, but will go into the practical side of the problem and discuss actual plant operations involved in the adding of vitamins to all types of food products.

Here again is an example of the value of the material which is published in FOOD INDUSTRIES. Regardless of the product involved, all food manufacturers are or soon will be definitely interested in Vitamin Fortification and the opportunity to benefit from the experience of others is obvious. That is the biggest factor in the rapid rate at which the food industries are developing today—the way in which the different branches of the field are learning from each other—taking advantage of progress being made by others and avoiding the repetition of mistakes which have already been made.

buyers, too, can benefit by AMS shields on their own labels.

Getting Ready to Apply for the AMS Service

In considering the cost of possible plant improvements to qualify for AMS inspection and grading service, many canners not now under AMS mentioned the situation in the shrimp canning industry and pointed out the experience of these canners who put their plants in shape to qualify for inspection by the Food and Drug Administration.

This experience is well stated in the 1935 Report of the Chief of the Food and Drug Administration:

"The extensive changes required in equipment and methods of operation at the time the inspection service was installed indicate clearly the reasons why such a large volume of regulatory operations on canned shrimp was necessary in the past. Many cannery buildings were not screened or protected against insects and vermin. Practically all plants had to discard such equipment as wooden picking and packing tables, wooden blanching tanks, and the like, which could not be effectively cleaned and replaced with metal or metal-covered wood which could be kept in a sanitary condition.

"Many plants had no inspection belts over which the shrimp could be inspected as it entered the cannery . . . Rearrangements had to be made in many factories whereby the shrimp could be kept moving rapidly into cans and delays conducive to spoilage eliminated. In most instances, processing retorts had to be equipped with temperature regulators and recording thermometers to insure that the product was sufficiently cooked to prevent subsequent spoilage in the can.

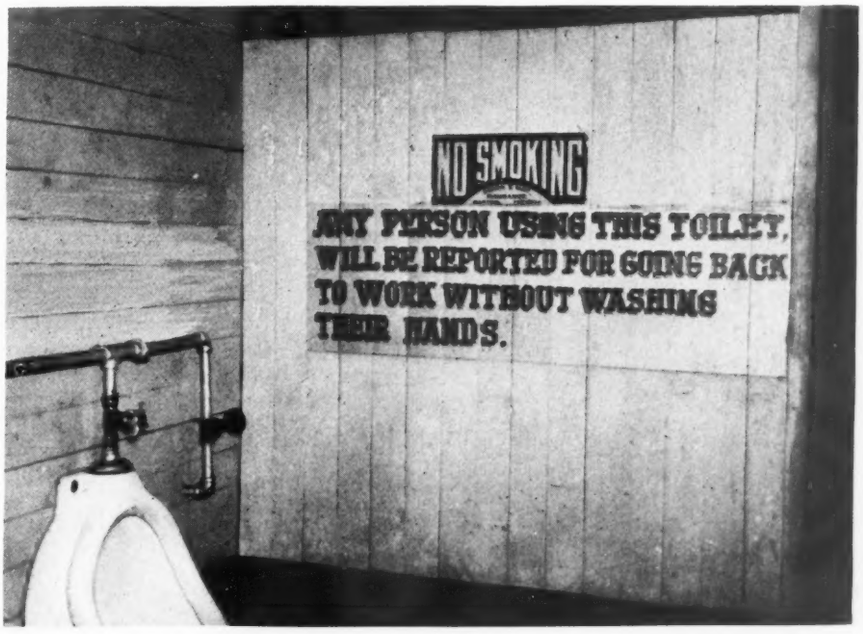
"These and other changes were required by the regulations to insure the packing of a sanitary, wholesome product. The packers have expressed great pride in the better conditions now prevailing in inspected plants. These canneries are no longer housed in dilapidated, ramshackle buildings with sour and decayed wooden equipment. The buildings are now practically insect- and vermin-proof and are continually kept in excellent sanitary condition."

The conditions then reported to prevail in the shrimp canning industry are, however, not characteristic of the whole canning industry. Many canners contemplating application for AMS inspection and grading will not face such drastic changes as was the case in the shrimp canning industry.

In the first place, AMS grading and continuous inspection is not compulsory. In the second place, it is improbable that AMS inspection and grading will be extended to any large number of plants in 1941 or even next year. In the third place, AMS can be expected this year, at least, to choose from a list (several times as large as AMS is willing to serve) only those plants which most nearly meet the requirements of AMS.

EDITORS NOTE:—This report does not pretend to reflect the thinking of the entire canning industry. It is a report confined largely to the thinking of those canners interviewed in Florida, including those who are processing and selling in direct competition with the two Florida canners whose plants this year are operating under continuous inspection by the Agricultural Marketing Service of the Department of Agriculture, and whose products are graded to U.S. grades.

Sanitary regulations in canning plants under AMS require that employees wash hands before starting work and before returning to work after use of the toilet. Liquid or cake soap and paper towels are provided. Paper-towel consumption averages between six and eight towels per employee per day.



One of the rules governing plant sanitation posted in the toilet in a plant under AMS continuous inspection.

AMS Reports on Progress

At least 17 canning plants will operate under Federal inspection this year

REPRODUCED below is a letter from Paul M. Williams which constitutes an official statement as to the acceptance of the AMS inspection and grading service by the industry.

Since receiving this letter, FOOD INDUSTRIES has been notified by Mr. Williams that a plant in Maine has just been accepted by AMS. This makes a total of at least 17 canning plants which will operate under AMS this year. These plants are in 11 different states.

The plant in Ohio which was accepted by AMS and listed in the accompanying letter will not be in operation this year. The producing area upon which the canning plant depended for the supply of raw material was commandeered by the government for the erection of a munitions plant.

Not only in this instance, but in others, have the fortunes of war affected AMS. There has been a drain on AMS manpower for checking food supplies for the Army, which will limit the extension of inspection and grading by AMS.

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
WASHINGTON, D.C.

April 10, 1941

Food Industries,
McGraw-Hill Publishing Company, Inc.,
330 West 42nd Street,
New York, N.Y.

Attention Mr. Ivan C. Miller.

Gentlemen:

In reply to your inquiry of March 31, we are now able to state definitely that continuous inspection service will be furnished to additional plants this year.

It is our purpose to enlarge this experimental work in order to try out this service on more commodities in different parts of the country. The project will be expanded to additional plants operating in Oregon, Washington, Minnesota, Illinois, Indiana, Ohio, and Pennsylvania.

The commodities to be canned this season under continuous inspection will include clingstone and freestone peaches, pears, grapefruit, grapefruit juice, sweet and sour cherries, fruit cocktail, fruits for salad, apricots, Italian prunes, corn, peas, tomatoes, snap beans, asparagus, beets, pumpkin, carrots, apples, apple juice, tomato juice, catsup, chili sauce, tomato puree, strawberries, gooseberries, boysenberries, youngberries, black raspberries, red raspberries, baked beans, and hominy.

Partial results of the studies of the consumer acceptance of the type of grade labeling resulting from this inspection work show that it would be desirable to continue the project so that a number of commodities that were not packed under continuous inspection last year will be available for such analysis of consumers' opinion this fall and winter.

We regret that we have not been able to render this service to all who have applied for it. With the heavy demands of the National Defense agencies for service we are forced to limit the continuous inspection service to a relatively few plants, as indicated.

Sincerely yours,

Paul M. Williams

PAUL M. WILLIAMS
Senior Marketing Specialist

Plant Without Laboratory Hires Chemist Without Experience

P.S.—Chemist makes good. He does everything from cut costs to improve the products. But his employer knows what a chemist is for and how to make the most of one

By THE GREENHORN CHEMIST

WHEN a chemist, just out of school and with no experience whatsoever, is hired by a food manufacturer who never had a laboratory before, yet wants to install quality control of his operations and products, the chemist may feel some hesitancy about his ability to create what the employer expects. At least that is the way I felt, for neither of us knew how to go about it.

Apparently the new food law and regulations in our state had convinced Blank Packing Co. that a laboratory was needed to insure that required percentages of this and that were actually met. And it seemed apparent that the management felt that they could also gain other benefits from laboratory control.

As the manager explained it to me, he could either hire an experienced chemist —who might be rather expensive from the salary standpoint—or else hire a recent graduate and teach him the business from the ground up. A recent graduate, he thought, ought to learn very quickly, because he would be a young man.

Even though I had been looking for a job for two months since graduation, I was fearful that the latter course of action would turn out about as well as hiring a blind chemist. Strange as it may appear, it required some persuasion to convince me that I could really do what the manager expected. I did not have the slightest idea of what routine tests should be made in a packing plant and, of course, was not even familiar with the apparatus and equipment needed. Even after the manager knew that I was a greenhorn he was still convinced that I should try the job.

The manager adopted a very sensible course in correcting my ignorance of what a chemist ought to do in a packing plant. He sent me on a ten-day trip to a lot of other plants in our line which had laboratories. Every chemist I called on went into great detail about the various problems that are common to all control laboratories. It was most helpful.

This article on

QUALITY CONTROL

Tells about food manufacturer who had never previously employed a chemist, or maintained a laboratory, and who hired a chemist with no experience whatsoever. The boy made good. But it was not solely due to his own ability. Had the management been less intelligent or failed to give the right sort of cooperation, this might have been a tale of disaster. Every employer and every young food technologist will find here how success comes from sound policies aggressively followed.

The Editors

Finally I wound up at the state food control laboratory, where I told them frankly what I was up against and received valuable assistance there. The state's chemists showed me the reasons for the analyses and tests they would make on our products, and then how to make them, for after the new state law went into effect every meat packer's products had to meet certain definite standards.

With a full notebook and a clearer understanding of what my new job would be, I returned to the plant and began to equip the laboratory. Everybody was most helpful, and the chief mechanic showed me how we could save considerable money by letting him make some of the equipment needed. When I had made a list of everything we needed to buy, the president and general manager sat down with me to discuss the best methods of purchasing, for it must be remembered that laboratory equipment and supplies had never been purchased there before. Finally we listed the stuff we needed from one company's catalog and asked for bids from several houses. During those days their salesmen got on my nerves at times, but their numerous free dinners made it worth the bother.

When a chemist goes into a place where they have never had laboratory

"But I never ran a laboratory before."
"Fine, we never had a laboratory before."

control before, he must have much patience and utilize every means available to learn about the type of work he should do. One should not confine himself to the valuable suggestions from management; there are many other sources of such information which should be consulted. The new chemist in such a plant must also be quite versatile, for he may be called on to act as an engineer, carpenter, plumber, electrician and purchasing agent.

Too Many Analyses

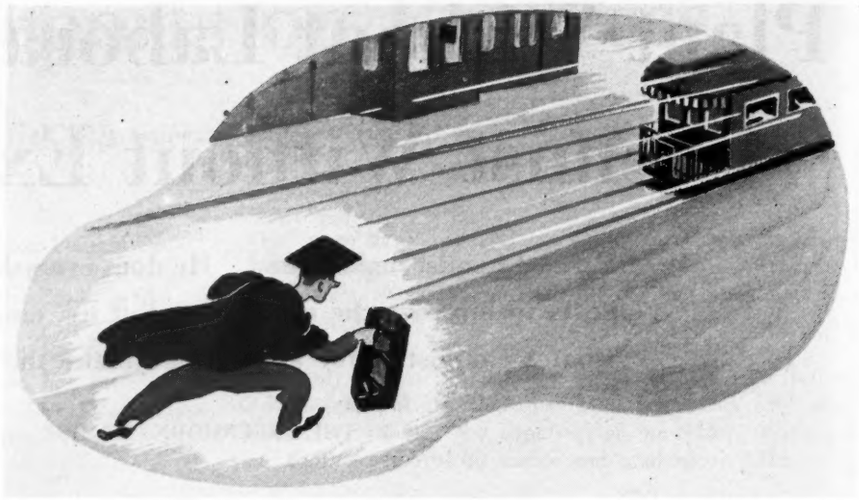
After the new laboratory was in working order, then the real job began, not the least of which was the problem of locating the places where we could save or make money for the company by proper use of the laboratory. At first, all I could hear was "make analysis on this" or "make analysis on that." In fact so many samples were brought to me for analysis during those first few days that I was "snowed under" for days and days.

Maybe they were merely anxious to find out if I really could make analyses. But they did not seem to realize that I could not very often make a finished analysis within 30 minutes after the sample had been turned in at the laboratory. Some of the foremen were difficult to convince that certain types of analysis often required much preliminary work, such as the preparation of many reagents and standard solutions, and the drying of samples.

But along with this deluge of samples for analysis I somehow managed to check up on some of our sausage products to learn if we were within the state's limits of percentage of cereal or added moisture. These analyses showed that we were considerably under the permissible 10 percent of added water. And so by gradually bringing the moisture content up to the limit we were able to increase our output by an appreciable number of pounds, and at the same time standardize the composition of our sausage. Analysis for added cereal showed that we were well under the 3.5 percent limit. All of this seemed to please the manager who, it first appared to me, was anxious to be certain that we were within the state limits.

Next, I tried reducing the cost of the cereal by trying less expensive materials and seeing how they showed up on the cereal anlysis as well as how they acted as binders. After much experimentation we found a satisfactory substitute for the very expensive binder we had been using, and an unbelievably small amount of this new, very potent binder proved to be sufficient.

All these experiments on sausage were very trying on the patience of our sausage foreman at first, but after a while I could tell that he was taking just as much interest as I in improving our sausage products.



"The management sent me on a ten-day trip to a lot of other plants in our line which had control laboratories."

In order to keep account of the various combinations we had tried, it was necessary to keep a very accurate and complete record of every formula we tested, including a complete analysis of each resulting product and with remarks about the taste and appearance obtained. After months of effort we succeeded in turning out a frankfurter much superior in appearance and of a decided improvement in flavor over our former wiener.

Although sausage products demanded most of my time, other control work got started too. My plan was to do a little work on all our products to locate and correct any outstanding errors, after which I expected to study the more difficult problems such as the kind and type of spices used in our different sausage products.

Meat and bone meal was another product needing close control because it is sold on a guarantee that it had 50 percent protein. Our first analyses showed that it was 5 percent over the guarantee, and also had almost 10 percent fat. The manager and I agreed that we could cut down the protein and also economize by eliminating this large excess of fat. Soon we were turning out a meat and bone meal that analyzed 51 percent protein and 5 percent fat.

Of course, when one is running as close to the state limit as this, it is necessary to make regular routine analyses to be safe. At first we had some trouble because the samples were not taken properly. It is useless to make careful analyses unless the sample analyzed truly represents the entire lot.

Analyses made on our No. 1 and No. 2 tallow also showed the need of regular control work on these products. The first few samples of this tallow to be analyzed showed that the M.I.U. (moisture, insoluble and unsaponifiable matter) was running considerably over the 1 percent that we were allowed. In fact, the moisture alone was over 1 percent. The free fatty acids on these first few samples ran about 4 and 5 percent. When the manager saw these results, he felt sure that a mistake had been made in the laboratory in making the chemical analyses, especially on the percent of free fatty acids present. Nevertheless, at my suggestion, an effort was made to reduce the percent of moisture and, as you would expect, the next samples had a free fatty acid content of only 1.5 to 2.0 percent. The percent of moisture was down below 0.5 percent. I believe that reducing the percent of moisture considerably was the big factor in lowering the percent of free fatty acids present in this tallow.

Develops Curing Salt

Soon our regular routine control work had been systematized so well that it was no longer requiring as much of my time as before. About this time I felt that the possibility of the preparation of our own curing salt should be investigated. Preliminary cost calculations showed that a very nice saving could be made by concocting a curing salt of our own. This was especially true in our case because we sold a very large quantity of bacon which required a large amount of the prepared curing salt we were then buying. This curing salt was also used in curing our hams and sausage.

As a starter on this problem I spent many a profitable hour with the man who was in charge of curing our various meats, letting him tell me many of the things he had learned through his many years of experience. His willingness to help made my task a lot easier. We had received many formulas for the sweet pickle

from the American Meat Institute. These served more as a standard than a practice to follow. Next, analyses were made on the prepared curing salt we were then using. Then a comparison was made between our pickle and the ones suggested by the Institute. These compared favorably, especially as to nitrite and nitrate content. So with these two pickles as a guide, I prepared the formula for our own pickle without the use of any already prepared curing salt. To do this we simply added a calculated amount of sodium nitrite and nitrate to the brine.

The manager was most anxious to try my proposed formula for the pickle on a very large number of hams. It was entirely against my wishes to experiment on such a large scale so we finally decided to cure (or rather to *attempt* to cure) about 15 hams by my formula. The results obtained were most satisfactory. Time of curing was reduced slightly and a very fine cure was obtained. The same general procedure was used in replacing the prepared curing salt used on our bacon by our own mixture. To cure our chopped meats, we substituted a solution of sodium nitrite and nitrate for the several pounds of the prepared curing salt that had been formerly used. We were most fortunate in having all these experiments prove satisfactory, so the final result was that we were soon saving money by ordering sodium nitrite and nitrate instead of the prepared curing salt.

Complaints had been received about our hams being too salty. The salometer that they had been using at the plant was checked against the several salometers that were purchased along with the rest of our laboratory apparatus. The comparison showed that the salometer they had been using at the plant read 5 deg. Sal. lower than the others. In other words, they had been using brine that was 5 deg. stronger than the actual salometer reading. This could possibly have been the cause of the salt hams.

Thermometers 5 deg. Off

Other control instruments were then checked. These included platform scales, pressure gages and the many thermometers that are used in such a plant. Two of the thermometers were found to be over 5 deg. off! Up until this time there had been no thermometers in our smokehouses, strange as it may seem. You can easily see how the failure to keep fairly constant temperatures in our smokehouses would vary the percentage of added moisture from day to day. Happily, our manager was willing to cooperate on matters such as these. So we soon had two thermometers in our smokehouses, one for the low-temperature and one for the high-temperature smokehouse.

The manager's evident confidence in my work and suggestions meant much to me and actually resulted in my working that much harder. Many were the nights I spent burning the midnight oil while working on various concoctions and changes in our methods and formulas that I felt might improve our products. You just can't realize how interesting this work is, once you get such a laboratory running reasonably smooth.

In my feeble efforts to improve our products I stumbled upon a way of improving the appearance of our pigs' feet. At first I felt it might just be my imagination. But, a thorough comparison by others of the pigs' feet produced by the two methods showed that the appearance had been definitely improved.

As you would expect, there were many suggestions, both from men within our company and from outsiders, in regard to possible work that I might do in the laboratory. Some of these sounded rather unimportant to me. For instance, among these was the suggestion that I analyze the various gasolines that were often used in our trucks in an effort to determine the most profitable one or the one that would give us the best mileage. The mileage that is obtainable from a gasoline depends largely upon the amount of "knock" that is produced when combustion occurs. The less knocking there is, the higher the compression ratio may be and the higher the possible efficiency. The octane number, while not defined as such, is a measure of the "knock" produced by gasolines. The higher the octane number, the less "knock" there is in the combustion of the gasoline. To measure the octane number, a very expensive knock-testing apparatus is required. So this testing of the octane number was entirely out of the question for us. I feel certain you could find small refineries that produce only straight-run gasoline that do not even own this knock-testing apparatus.

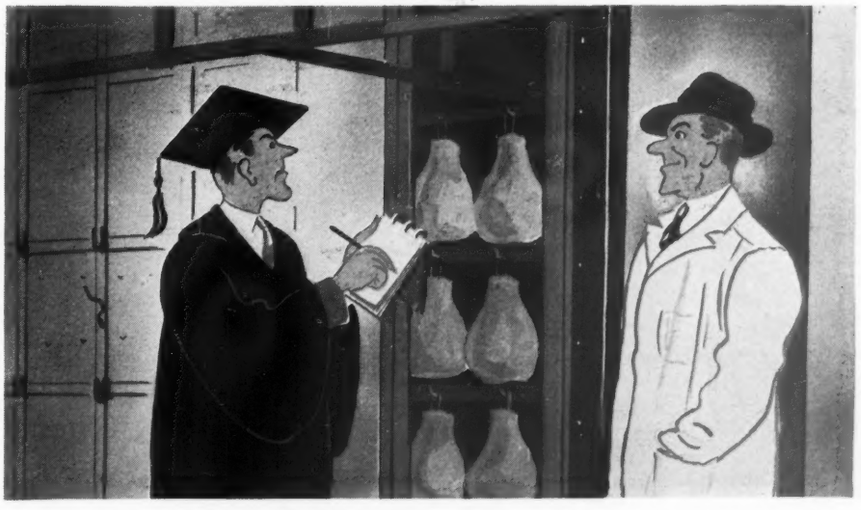
A much more satisfactory way to attack this problem of mileage would be to conduct test runs to determine the mileage on different gasolines, using the same trucks and with as near as possible the same conditions throughout. As to work on gasoline that might be done in the laboratory, gum, sulphur and corrosion tests could be made, but it seems to me that this type of work should be kept on the "waiting list" until work around the laboratory becomes very scarce indeed. All this has been mentioned to show that it is wise to look ahead and try to see if the potential results to be obtained on a suggested problem will actually be worth the time and money spent working on it.

Make Own Vinegar?

Another problem that the management asked me to investigate was the possibility of saving money by making our vinegar. Frankly, I never gave this suggestion of producing vinegar from apples a serious thought for, after all, we were in the meat packing business. This idea sounded like a grocer opening a bakery in order that he might save on bread purchases. It did occur to me, however, that we might buy concentrated or rather glacial acetic acid and dilute this to about 5 percent in order to secure our vinegar. As I understand it, this could be done and would probably produce a satisfactory vinegar. Preliminary cost calculations show that this could result in noticeably reducing the cost of the vinegar, but it was not attempted because of legal restrictions.

Quite a bit of work will be done toward improving our method and equip-

(*Turn to page* 113)



"What's the temperature of this smokehouse?"
"Oh, about medium hot."

Wheat "Peeling" Process Yields High-Vitamin Flour and Bread

By using flotation method borrowed from mining practice, Earle Process removes wheat hulls. Remainder when milled, produces flour that retains vitamin content, does not turn rancid, but has lower crude fiber content

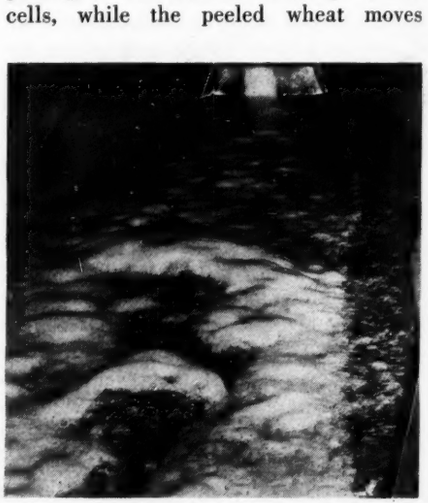
BORROWING a method long used in cleaning metallic ores, Theodore Earle, a mining engineer, has developed a way to remove the rough outer hulls from wheat kernels without in any way damaging the remaining part of the wheat berry. These hulls are light, fibrous and tough, and contain practically none of the nutritive elements of wheat. They are present in 100 percent whole wheat flour, but are removed from ordinary white patent flour along with the rest of the bran, the wheat germ and most of the minerals and vitamins, which are largely found in the layers just under the outer hull and in the germ.

Seeing the possibility of producing, through Earle's process, flour and bread that would be practical equivalents of 100 percent whole wheat products in nutritive values and yet would be without the outer fibrous hull of the wheat, Continental Baking Co. has taken over this process. And it has carried the process through to commercial development, with the result that bread, called "Staff," is now being marketed in several cities.

Removing the outer covering of the wheat berry by flotation requires that the wheat undergo the receiving, binning and rough cleaning operations ordinarily used by millers. These include the use of a "Millerator" for removing corn, chaff, straw, stones, dirt and other foreign matter. Next is the "Carter Disc," used to remove oats, weed seeds, broken grains, shriveled grains and similar material.

After this cleaning, the wheat is conducted through a series of ten flotation cells, wheat and water being fed in in definite proportions. Here the wheat is violently agitated by means of rubber-covered impellers against the rubber-lined sides of the cells. The mixture of wheat and water flows rapidly from one cell to the next in the series, at a constant rate. Meanwhile, a flotation reagent—pine oil—is added to cause a froth.

As the finely divided bubbles of this froth rise they carry the freed wheat hulls to the surface. The peeled wheat remains below. The froth with the peeling is removed at the top of the cells, while the peeled wheat moves along to the end of the chain of cells where it is discharged onto a vibrating screen that removes most of the water. Total time of passage of wheat through the flotation process is 9 minutes.



The foam and froth discharged from the flotation cells carry away wheat hulls and dirt.

Peeled wheat and water are discharged from the flotation cells to a vibrated screen where most of the water drains off.

The next step is to whirl the wheat dry in a horizontal centrifugal, through which it passes in about 1½ seconds. Then final drying is accomplished in horizontal rotary dryer. This is 5-ft. diameter cylinder, 30 ft. long, equipped with a central heating tube through which hot, dry air is passed. This air returns through the space between the tube and the outer shell of the dryer, where it comes into direct contact with the wheat. Passage through the dryer takes 12 minutes.

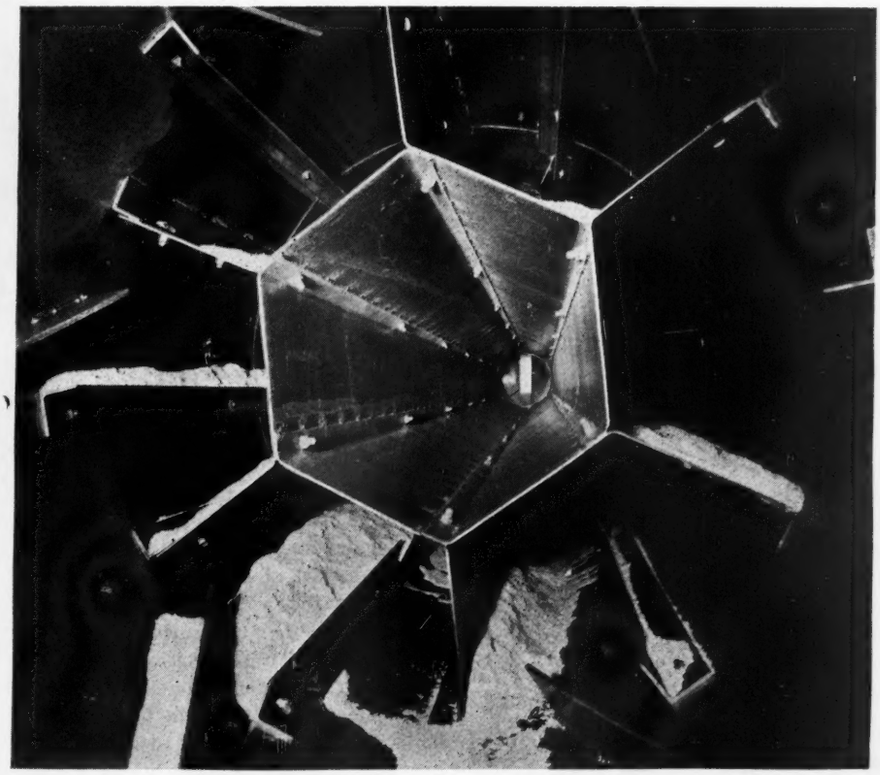
Dry, peeled wheat next passes through an aspirator which blows away any particles of hull that may have been carried along to this point. Then the wheat is elevated to tempering tanks to await grinding. As it enters these tanks, the wheat is still moist to the touch, but during tempering this moisture is absorbed, so that the wheat feels dry.

Grinding is carried out by means of "Mikro-Pulverizers" of the hammer-mill type. These produce the fine, golden-colored flour called "Staff." Comparative analyses of this flour and 100 percent whole wheat flour are given by Continental Baking Co. as follows:

	100% whole wheat flour (percent)	"Staff" flour (percent)
Moisture	11.4	11.5
Protein	14.8	15.3
Minerals	1.62	1.63
Crude fat	1.82	1.78
Crude fiber	2.00	1.38

This indicates that the peeling process causes a slight rise in the protein content and a definite reduction in the amount of crude fiber, while the mineral content remains the same. Vitamin assays of the "Staff" flour are said by the Continental Baking Co. to show 965 International Units of vitamin B_1 per pound, which compares to 973 I.U. of vitamin B_1 per pound, of 100 percent whole wheat flour and 75 to 100 I.U. per pound of white patent flour.

Inventor Earle watching his flotation process remove wheat hulls from unmilled wheat.



Looking into the discharge end of the dryer where the peeled wheat from the flotation equipment is finally dried before grinding.

The flours compared in these analyses are said to be all high in vitamin B_1 because all were made from wheat specially selected for Continental's own flour mill.

A typical analysis given by Continental Baking Co. of the "Staff" bread now being marketed is given as follows:

	In percent
Moisture	37.40
Total solids	62.60
	100.00%
Composition of solids	(percent)
Protein	15.92
Ash (less salt)	2.13
Salt (NaCl)	2.17
Crude fiber	1.71
Crude fat	6.31
Carbohydrates	71.76
	100.00%

Keeping quality of the flour made from the "peeled" wheat is said by Continental Baking Co. to greatly exceed that of 100 percent whole wheat flour, as the new flour has been kept for several months without showing rancidity. Why rancidity does not develop is not known, but it is thought that removal of the outer bran coating may aid in its prevention.

One additional advantage is said to be that the flotation process removes a considerable amount of dirt that could not be removed by ordinary methods. And, finally, wheat grains containing weevil eggs are said to be floated off in froth, along with dirt and wheat hulls.

At present, this new flour is being produced at the rate of about 1,000 bbl. per day at Continental's mill in Kansas City. Soon it will be in production at a like rate at Missoula, Mont. At present, all the production is going to Continental, but it is expected that, before long, other millers will be licensed to use this patented Earle Process of flour milling and then the product will be more widely available.

Boiler Water Conditioning Avoids Trouble and Expense

Part I—Besides protecting the boiler from scale, lowered efficiency and possible serious failure, suitable water treatment eliminates possibility of food contamination from contact with steam

By ROBERT A. CLARKE, *Director of Research, Acme Breweries, San Francisco, Calif.*

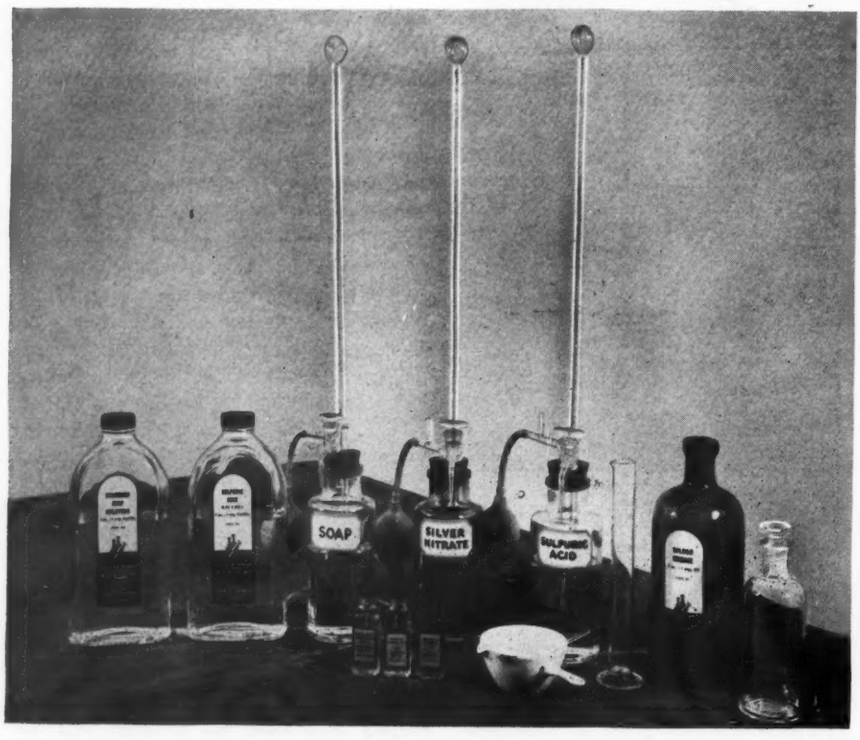
PURE WATER in the chemical sense rarely exists outside of a few laboratories where it has been produced with great care. What we normally regard as water is in reality a solution which, when evaporated in a steam boiler, rapidly becomes concentrated. Ultimately the concentration reaches a point where precipitation takes place and scale is formed.

In central station practice where the product is power, the problem is restricted to the protection of the steam generators, turbines, and auxiliary equipment from injury and to the maintenance of operating efficiency. In the food industries, however, steam is often used for direct heating, by injection of live steam into the food, so that in addition to these considerations every bit of matter in the boiler feedwater must be regarded as a possible ingredient of the product.

This condition leads to widely differing attitudes towards the problem. The chief engineer, who is charged with the maintenance of service facilities, has the central station attitude toward protecting his equipment and maintaining the efficiency of his power plant. A production executive is interested in protecting his product from anything which might tend to lower his quality standards.

In some cases a realization of the possibility of carry-over of water from boilers has caused superintendents to forbid the addition of anything whatsoever to feed water or directly to the boiler. Possibly bitter experience with so-called "boiler compounds" of yesteryear may well have justified their fears.

The day is safely past, however, when we are forced to accept water as we find it. Twenty years of diligent research and application have made the benefits of intelligent water conditioning available alike to the great central station and humble process plant. The trend of this progress has been toward simpler apparatus and more fundamental chemistry. Physical chemists have studied the mechanism of scale formation by various minerals encountered in water. They have learned how to apply certain chemicals to prevent precipitation, to a large extent, of those things which normally cause scale. The requirements of the chief engineer and those of the production superintendent are not at all incompatible, but are, in fact, two different aspects of the same problem. When water is properly conditioned for the boiler and consideration is given to the minerals added and to the reactions occurring in the boiler, both the requirements of engineer and production man will be satisfied.



Reagents and apparatus used in simple kit for testing boiler water.

Carry-over

The process man's concern with the problem of boiler water conditioning is the fear of what might be carried over with the steam. For this reason a discussion of what carry-over is, how it occurs, and the amount of material that may thus become a part of the product is, therefore, important.

Carry-over for our purpose may be defined as the transportation of boiler water with the material contained therein by the steam as it leaves the boiler. Few boilers in general service deliver clean dry steam under all conditions. The design of the boiler, the rate of evaporation, the rapidity with which changes in load occur, the condition of the water *in the boiler* with respect to the quantity and nature of the impurities, the operating pressure, etc., have an important bearing on the amount of carry-over.

Carry-over is attributable to foaming, priming, and mere mechanical entrainment of boiler water.

Foaming is to some extent present in every boiler under load. It is the height and stability of this foam that is of importance. In the case of ordinary inorganic salts such as sodium sulphate, hydroxide, carbonate, chloride, etc., and where the suspended matter is fully wetted, the tendency to foam is roughly proportional to the sum of the dissolved and suspended solids in the boiler water. The presence of caustic soda, however, seems to promote carry-over. On the other hand, a few parts per million of oil, grease or organic matter which form soaps in the alkaline boiler water will give more unmitigated grief than many hundred parts per million in ordinary mineral water.

Priming is largely a matter of boiler design. Some boilers will prime at the slighest excuse, while others are so well arranged that they will hardly prime even under the most adverse conditions. Priming is caused by a sudden change in load or by overloading the boiler. It is a more or less violent phenomenon accompanied by bouncing water level and shock as slugs of solid water are carried out of the boiler. Sudden increases in load tend to cause priming by reducing the pressure in the steam drum. The water in the tubes approaching this drum, now superheated as compared to the reduced pressure, partly flashes into steam, causing violent agitation of the water surface and spraying water up close to the nozzle where the steam velocity is a maximum. On serious overload, the steam generated likewise causes great turbulence of the water surface. In either case, the water becomes mixed with the steam and is carried out of the boiler.

Mechanical pick-up, being a non-violent process, is not as apparent and easily recognized as priming although similar in nature. Pick-up is due to the bursting of the steam bubbles as they leave the surface of the water in the steam space. Hence, as the rate of steam generation is increased, so also is the violence of these eruptions and likewise the amount of water thus entrained.

The important question is how much material is likely to be carried over under normal conditions in the average food products plant. For the purpose of estimation, consider a steam boiler operating at 150 lb. per square inch gage, with feedwater at 210 deg. F., the concentration within the drum being 2,000 parts per million (p.p.m.), delivering 3,460 lb. of steam per hour with 5 percent moisture (100 boiler horse-power). All of these factors will be recognized as normal and usual. This boiler will deliver 0.346 lb. of solids per hour in the steam.

If this steam is used directly to heat water from 60 deg. F. to boiling, it will heat about 2,650 gal. per hour, making a total volume of 3,180 gal. with the condensate added. The total solids in this volume of water will be increased 13.6 p.p.m. by the matter transported from the boiler by the steam.

Testing boiler feedwater to determine mineral content.

Even if this figure were doubled or trebled by reason of poorer quality of steam or higher concentration in the boiler drum, the amount would still be immaterial, if the boiler feedwater were the same as that used elsewhere in the process with satisfactory results, or if simple inorganic chemicals were used to treat the boiler water. Boiler water can be and is being treated every day everywhere with simple inorganic chemicals.

Of course, if the boiler is foaming or priming seriously, this figure will not apply and the quantity of material carried over may be much greater and very irregular. These are abnormalities and should be dealt with accordingly, not considered as the basis for prohibiting treatment of the boiler water.

An analysis of the condensate from some surface-type heat exchange will furnish not only an estimate of the quantity, but the nature of the carry-over as well. The sample should be taken at a time when the load is high and fluctuating, and when the concentration in the boiler is at a maximum just before blow down. This will give the worst condition.

If carry-over is of real concern, it can be materially reduced. High concentrations in the boiler water promote carry-over. Concentrations may be economically kept low by employing continuous blow down through efficient heat exchangers which transfer most of the heat otherwise lost to cold-make-up water. This simple piece of apparatus is rapidly gaining favor.

Where oil and grease cause foaming, the elimination of reciprocating pumps and engines, if practical, or the discarding or filtering of condensate from such units generally will remove the source of the trouble.

Modern boilers have carefully baffled steam off-take drums so that the steam will have to change direction of flow several times to reach the outlet or pass through a series of screens to extract the moisture. In older boilers, the installation of simple baffles or efficient steam purifiers will help materially.

Priming is more difficult to control because it is inherently a question of boiler design. However, low concentrations and, if possible, scheduling of load to reduce the peak and level-out fluctuations, will minimize the conditions causing the boiler to prime.

In former years the market was flooded with so-called boiler compounds, each

(*Turn to page* 121)

How the British Make Jams

Part I—English factories produce 60 kinds of jams, for which they have worked out improved methods of processing. The theory involved and methods of practical control are covered in this article

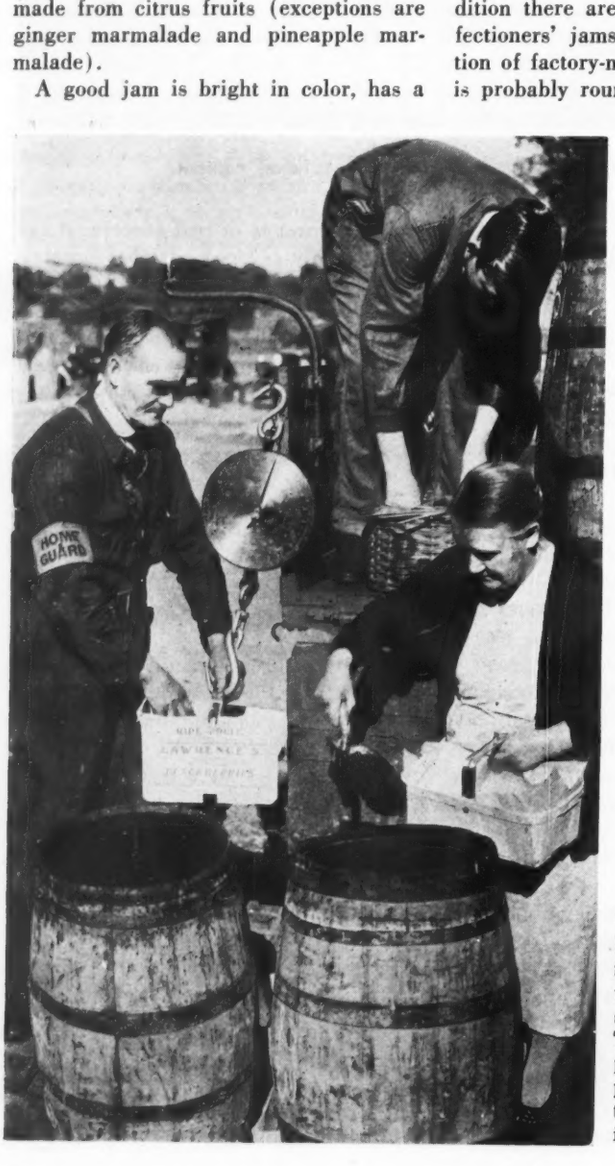
By H. B. CRONSHAW, *London, England*

JAM making is a method of preserving fruits (and certain vegetables) by boiling them with sugar so that the product sets to a jelly consistency on cooling. Jam consists of fruit (whole or in fragments) embedded in a jelly formed by pectin in the presence of sugar and acid; in other words, fruit tissues embedded in a pectin-sugar-acid gel. Marmalade is a similar preserve made from citrus fruits (exceptions are ginger marmalade and pineapple marmalade).

A good jam is bright in color, has a pleasant fruity flavor, is well set but not too stiff. It also keeps well by reason of its high sugar content.

Next to the fresh fruit market, the industry is the most important outlet for fruit grown in Britain, amounting to about one-quarter of the total supply, excluding apples. More than 50 kinds of jams are manufactured and 21 varieties of fruit are utilized. In addition there are about 10 kinds of confectioners' jams. The annual consumption of factory-made preserves in Britain is probably round about 8 lb. per head of the population. Two-thirds of the production consists of jam, about one-third marmalade, and only 2 percent jelly. The most popular preserve is strawberry jam.

A considerable proportion of jam is made from fruit preserved by use of sulphurous acid or other sulphites ("sulphited pulp"), but despite this, jam manufacture is largely a seasonal occupation, with its peak in the summer fruit season. Most of the marmalade is made during the early months of the year when supplies of fresh oranges are available at suitable prices. The result is that the British jam maker generally takes up other lines of manuafcture, such as pickles, candied peel, mincemeat and plum puddings, sauces, mayonnaise, and so forth, which can be distributed through much the same channels, thus serving to even out production and to spread sales expenses.



British Combine

Buying wild blackberries from pickers at a collection center in Monmouthshire County, England. The berries are weighed, put into barrels and transported by truck and rail to factories for jam making.

Theory of Jam Making

As already remarked, jam (and also marmalade) consists of fruit tissues embedded in a pectin-sugar-acid gel, and is formed by boiling fruit with sugar in the correct proportions. On the one hand, there are the fruit tissues (in the form of whole fruit or fragments); on the other hand, the matrix of jelly in which the tissues are embedded. It is on the conditions necessary for the formation of this jelly that technical interest is centered.

Considered in a broad sense, the essential conditions for gel formation in the case of jam, jelly or marmalade are, firstly, that three ingredients—pectin, acid and sugar—are present; and, secondly, that they are present in certain proportions if a jelly of the most suitable consistency (or "set") is to be obtained.

Of the three ingredients, pectin and acid are furnished by the juice liberated from the fruit during cooking. The sugar is, of course, added as such, but a certain small proportion (fruit sugar) is supplied by the fruit juice.

Looked at from this angle, the question of insuring the correct pectin-acid-sugar ratio under factory conditions has the appearance of being a pretty stiff problem when one considers the fact that the amount of each of these ingredients varies in different varieties of the same fruit, even in the same variety grown under different conditions. Fortunately, nature makes up for her vagaries by not being particularly precise in her demands. So generations of experience, coupled with a system of keeping track of these variations by sim-

Old English marmalade "prepared by a special process retaining the valuable bitter tonic properties of the Seville orange." It is made by Chivers & Sons, Ltd., Histon, Cambridge, England.

ple, rapid tests, enables the manufacturer to adjust his recipe in accordance with any variations of practical significance and so to turn out a product which is consistently satisfactory in composition and texture.

There are two methods of approach. One is theoretical. The other keeps to the question of practical measures of control. We will briefly review each of these.

From the theoretical standpoint, there are three factors to be considered; namely, pectin, acid and sugar. Pectin is present in ripe fruit and is formed during the ripening process by action of enzymes on the complex, insoluble substanee, pectose, which is associated with the tissues of the fruit. The pectin thus formed is soluble in water or dilute acids, giving a colloidal solution. With overripening, the pectin in turn breaks down into "deteriorated" pectins and pectic acid which have no jelly-forming properties. Consequently, the first condition of successful jam making is to pick the fruit when it contains the maximum amount of pectin, which is generally at the firm-ripe stage. Depending on the quality of the pectin, 0.5 to 1 percent is roughly the amount required in practice to form a jelly.

In this connection there is, however, another point to be borne in mind, and that is the varying pectin content of different fruits, to which reference has already been made. For example, lemons, bitter oranges, quinces, apples, gooseberries, currants and plums are rich in pectin, while raspberries, strawberries, cherries and blackberries are comparatively poor in pectin. Hence arose the production of mixed jams such as blackberry and apple, strawberry and gooseberry, and so forth.

Another point to notice is that pectose is converted into pectin during the process of precooking the fruit, either simply with water, or by cooking under pressure, with or without the aid of dilute (0.3 to 0.5 percent) citric or tartaric acid. Certain limits of time and temperature have, of course, to be observed or otherwise the gel-forming properties of pectin are desrtoyed in much the same way as in overripening.

The second factor, acidity, plays its part in the sense that the formation of the pectin-sugar-acid gel only occurs within a certain limited range of hydrogen-ion concentration. Outside this range, the mixture is a sirup. Within this range, maximum gel strength is attained at about pH 3 for pectin solution (or pH 2.45 for a pectin jelly of maximum strength for a given pectin-sugar mixture). These values vary slightly according to the kind of acid and the buffering salts present. Thus sulphates move the point of maximum gel strength to the less acid end of the pH range, while tartrates and citrates have the opposite effect and also render the jelly strength somewhat less sensitive to changes in pH—hence their use in preventing "syneresis" or "weeping jelly" caused by too great acidity of the juice.

From the fact that fully ripe fruit is much less acid than full-grown, unripe fruit has arisen the common practice of mixing the two kinds when making jam. Cherries (except Morellos), strawberries and certain kinds of apples and blackberries require the addition of acid to supply their natural deficiences, either in the form of an acid juice (red currant, gooseberry or lemon) or tartaric or citric acid.

Sugar has to be considered from four aspects:

1. The concentration most suitable for the formation of a gel.
2. Its function as a preservative.
3. Its liability to crystallize in the jam.
4. Its sweetening power.

The concentration of sugar most suitable to the formation of a gel approximates a saturated solution under any particular conditions. The quantity necessarily varies with the acidity and pectin content of the juice or fruit. When these are high, jellies can be made with less than 60 percent of sugar. A concentration of 65 to 70 percent of added sugar is, however, usually the range in which firm commercial jellies are formed. Excess of sugar results in a sticky sirup.

Sugar in sufficient concentration acts as a preservative for the fruit, thereby preventing the growth of molds and enabling the jam to be kept in good condition over a considerable period. The amount usually prescribed (*i.e.*, added sugar) is about 65 percent of the weight of the finished jam, for with less, particularly if the "set" is weak, the jam is liable to ferment. On the other hand, if more is present, there is danger of some of the sugar crystallizing out, and the jam will also be too sweet.

During the process of jam making, a portion of the sugar is inverted from sucrose (cane sugar) to a mixture of dextrose and levulose. If this has not proceeded far enough, sucrose is likely to crystallize out in the jam on storage. If too far, dextrose may grain out, resulting in "soft crystallization." A 30 to 50 percent inversion is usually considered safe. Inversion takes place by action of the fruit acids during boiling,

Jar of black currant jam made in England by Wm. P. Hartley. It is made only from fresh fruit and high-quality sugar. It contains no artificial coloring or preservative.

but in order to obtain better control, and also to reduce the boiling time, a portion of the sugar is commonly inverted before addition to the fruit. The use of glucose also performs the same function of lessening the tendency to crystallization.

Practical Control

From the standpoint of practical con-

trol, the main points for consideration are:

1. Consistency, as determined by: (*a*) Fruit-sugar ratio, (*b*) quantity and quality of pectin, (*c*) acidity.
2. Keeping quality, as determined by: (*a*) Total sugar content.
3. Tendency to crystallization, as determined by: (*a*) Percentage of sugar inverted, (*b*) acidity.

Tackling the problem on a broad basis, the primary consideration is evidently the fruit-sugar ratio, as this determines both gel consistency and keeping up at frequent intervals the total specified for each kind of jam (see below), it becomes a matter of checking up at frequent intervals the total sugar content of the finished jam and making any necessary adjustments in the basic recipe to take care of variations.

This is rapidly done by a sugar refractometer graduated in refractive indexes and also in sugar percentages which, in the case of jams, are generally taken as equivalent to total soluble solids. The readings require some correction (though this may be minimized by well mincing the jam beforehand) because the jam is not homogeneous. To arrive at the true percentages, the method recommended by Macara may be followed (see *Analyst* 55, 353, 1931).

The amount of invert sugar in the jam is best estimated by Lane and Eyron's methylene blue method.

Estimation of pectin by the calcium pectate method, or by viscosity and specific gravity tests, is unreliable. It is therefore usual to employ a rapid, though approximate, determination by precipitation with acetone, followed by drying and weighing. The character of the precipitate is an excellent guide as to the nature of the pectin present; if hard and firm, the quality is good; but if soft and somewhat flocculent, it consists largely of pectinous or pectic acid, which is of no value in jam making.

According to the experience of Morris, if the gel is obtained prematurely (*i.e.*, before the specified concentration of total solids is reached), the quantity of added pectin should be reduced. If there is a sticky, indefinite end-point in spite of the fact that a good deal of pectin has been added, the pH of the material is probably at fault. Tarr found that the pH of the pectinous juice (or pulp) before the addition of sugar should be about 3, and much can be done to cut down the amount of pectin added by attention to the acidity.

From what has been said concerning the part played by acid in the formation of the sugar-acid-pectin gel in bringing about the inversion of the sugar, the determination of pH is obviously of considerable utility.

The continuous estimation of total soluble solids and percentage of invert solids, together with the occasional estimation of pectin and acidity, provides the chemist with data enabling him to maintain control of the processing operations.

On this all-important question of the fruit-sugar ratio the manufacturer has a guide. Ten years ago, public analysts and manufacturers, acting through their respective associations, agreed on certain standards for first quality jams and second quality jams, embracing single-fruit jams and mixed jams containing two kinds of fruit:

a. All jams (whether of first or second quality) shall contain not less than 68½ percent total soluble solids as determined by refractometer reading when cold and uncorrected for insoluble solids.

b. Jams shall have certain minimum fruit contents (*i.e.*, the number of pounds of fruit to be used for making 100 lb. of finished jam) as specified in the following tables:

First Quality Jams

Single-fruit Jams

	Fruit content Percent		Fruit content Percent
Strawberry	42	Red plum	40
Raspberry	38	Damson	38
Black currant	30	Apricot	40*
Red currant	35	Blackberry	38
Green gooseberry	35	Loganberry	38
Red gooseberry	40	Cherry	45
Greengage	40	Peach	40*
Victoria plum	40	Rhubarb	45
Green or golden plum	35		

* Apricot and peach jam: The equivalent of four 5-kilo tins of apricot or peach pulp, containing no added water.

English bramble jelly, the product of Frank Cooper, Ltd., Oxford.

Mixed Jams

The minimum percentage of fruit content in mixed jams and the minimum proportions of each named fruit present shall be as follows:

	Fruit content* Percent	
Strawberry and gooseberry	40	(20/20)
Gooseberry and strawberry	40	(30/10)
Raspberry and gooseberry	40	(20/20)
Gooseberry and raspberry	40	(30/10)
Raspberry and red currant	40	(20/20)
Plum and apple	40	(20/20)
Apple and plum	40	(30/10)
Blackberry and apple	40	(20/20)
Apple and blackberry	40	(30/10)
Household, two-fruit jams, or any other jams not mentioned in the schedule	40	

* Two-fruit jams: The figures in parentheses ( ) denote the respective proportions of each named fruit required to be present. The proportions for two-fruit jams not specially mentioned to be on the same basis.

Second quality jams shall contain not less than 20 percent of fruit for all varieties of jam, both single-fruit and mixed. In the case of mixed jams, the minimum proportions of each fruit are half those given, in the parentheses, in the above table, *e.g.*, strawberry and gooseberry 20 (10/10); gooseberry and strawberry 20 (15/5).

As regards the description on the label, the following samples are recommended:

FULL FRUIT STANDARD
This jam is guaranteed to conform to the agreed full fruit standard of the Food Manufacturers' Federation.
} For First-quality Jams.

LOWER FRUIT STANDARD
This jam is guaranteed to conform to the agreed lower fruit standard of the Food Manufacturers' Federation.
} For Second-quality Jams.

The addition of fruit juice in second-quality jam must be indicated, *e.g.*, "Strawberry with Other Fruit Juice," except in mixed jams containing no added fruit juice or pectin. In the case of first-quality jams no declaration of added fruit juice and/or pectin is required.

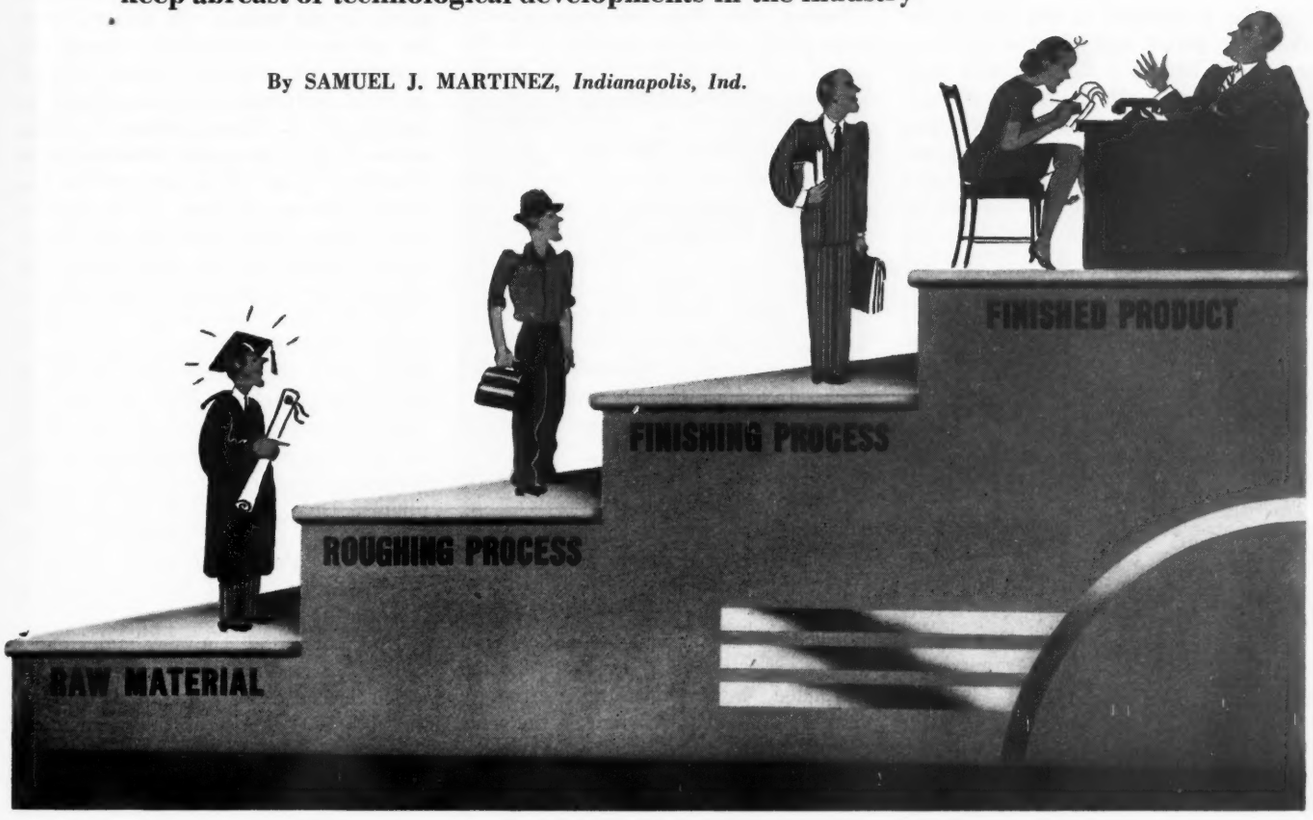
The use of citric, tartaric and malic acids is permissible in Britain without declaration, for the purpose of acidifying jams where the fruit is deficient in acid. The use, when necessary, of permitted artificial coloring matter in jams is also allowed, without declaration on the label.

Part II of this article, covering raw materials, boiling and the semi-automatic processing methods, will be published in a subsequent issue of FOOD INDUSTRIES. —THE EDITORS.

Building Men for Progress

How a food company trains college graduates for supervisory jobs. These men are insurance against failure to keep abreast of technological developments in the industry

By SAMUEL J. MARTINEZ, *Indianapolis, Ind.*



The two-year training program takes the engineering college graduate up the steps of industrial practice to a supervisory position in the company

TOO many plants, once they have solved all their immediate difficulties and settled down to a smooth program of production, are willing to continue on such a basis and make no further efforts to improve their process. As a result many plants practically go to seed and suddenly wake up after six or eight years to find they are faced with the problem of competing with another manufacturer who is putting out a better quality product at a lower production cost. In this present day of industrial research, no company can afford to stand still. And often, alertness as to the applicability of new methods may mean a generous increase in profits in the near future.

But new methods must be developed and put into practice by men—men educated in the theories of the process and trained in their practical application. It is for the development of such men that student training programs are instituted by food manufacturers.

I have just recently completed a two-year student training period with one of the leading corn milling companies. During this period some of my time was spent in actual production work, but a great part of it was devoted to simply learning the business. This company considers its student training program an important factor in keeping its processes up to date. And it believes it is far better to have an abundance of trained men available than to have to rely on promotion alone in case of emergency.

It is the company's policy to fill 50 percent of the openings, as they occur, with young engineers who have completed the student training program at the plant. It is equally important, however, that the remainder of these positions be filled by men who have risen in the ranks and have had the value of long years of operating experience. As a result, development in the plant is a combination of the more up-to-date theoretical methods, as suggested by the recent college graduates, with the prudence and practical experience of men who have learned the methods by doing them. Such a combination is bound to mean continual progress in the form of improvement of quality and reduction of operating costs. If an industry wishes to keep in step in the competitive world of today, it must keep an eye to the future and not be content to leave things as they are.

Selecting Graduates

The men who are chosen for this student training are carefully selected from the graduating classes of leading engineering universities. Interviews are conducted at the various campuses prior to graduation, and from these interviews prospective trainees are selected. Every new man entering the company

is on a six-month probationary basis. If, at the end of this time, he shows sufficient interest, aptitude and high quality workmanship, he is retained on a permanent basis. On the other hand, if his work is inferior, his interests not primarily along the line the company offers, or if for any other reason he does not seem to fit into the company program, he is released at the end of the six-month period and given suggestions or help in finding a more suitable type of employment. At the end of every month, comprehensive ability-rating sheets evaluating the student's work are filled out by the departmental heads and foremen under whom he has been studying. These ratings are tabulated and serve as an accurate check on the general quality of workmanship of each man. In this way the company assures itself of obtaining in its training men of the highest caliber who will be of the most service to the company in the future.

Introductory Course

Upon commencing work at the plant the student first goes through a one-month introductory course in which he spends three or four days in each division. During this time he becomes familiar with the geographical layout of the plant and equipment, and becomes acquainted with the supervisory personnel. He gets a complete picture of the plant processes from the beginning to the finished product, with the result that later on, details acquired will fit themselves more clearly and logically in his mind in connection with the whole. He keeps a notebook in which he records all information he regards as important and also makes sketches of various equipment. He prepares a set of flow sheets covering the general flow of the entire plant and also a list of questions or suggestions which may have occurred to him during this period. This notebook is handed in and checked to make sure the student has not gathered any mistaken information or missed any important steps in the process.

Advanced Training

Upon completion of the introductory course, the student is turned over to one of the divisional superintendents for a more detailed study of that division. This period runs from four to six months, depending on the amount of work to be covered. As the student enters a division he first reviews the work of that division with the superintendent, after which he will spend from one to three weeks in each department under the supervision of the foreman. Here he is "broken in" on each job sufficiently to understand the work involved. He draws equipment flow diagrams, complete with operating data, and he discusses with the foreman various operating precautions and problems encountered in that department. He then moves on to the next department, and so continues until he has covered the entire division.

During this time he keeps careful notes which must be handed in at the end of each month for checking by the divisional superintendent and the various department heads, to prevent inclusion of misinformation. This also serves as a check on the progress that each student is making. The notebook is the property of the student himself, and he is urged to put his notes in the form that will be of greatest use to him later on. An outline is furnished each student to guide him in the work he is to cover in each department. Questions are also provided by which the student may check himself on the completeness of his information.

When the student has completely covered a division, he reviews what he has learned with the superintendent. Here he is also urged to make suggestions for improvements or ask for information on manufacturing details he might have been unable to obtain elsewhere. His training in that division completed, he is then transferred to the next division to continue in the same manner. Thus it can be seen that by the time the student has covered the entire plant he has an insight into every job and understands the process and manufacturing problems every step of the way. He now has a training that 10 to 20 years of operating experience might not duplicate. He may now be given a permanent position in the developmental, engineering or research departments and be expected to capably fill it.

In order that they may acquire much of the operating theory of the industry, the students are themselves organized into a group which meets once a week. Various topics are assigned to the students, and at each meeting one of the students presents a paper covering the topic assigned to him. At the close a forum is held for questions and discussion among the students. Any points in doubt are followed up and answered at the next meeting. Short abstracts of interesting articles from current technical magazines are also presented at these meetings.

Besides their regular student duties, the trainees are also given various problems to work on or experimental changes in operation methods to try out and correlate the results. To them also has been given the task of compiling and keeping up to date a complete file on operating data and process control for the entire plant.

Specialized Training

In addition to the regular training there are several specialized training programs such as laboratory training and the mechanical division apprenticeships. In the former, the student, after his one-month introductory course acquainting him with the process flow in general, is transferred immediately to the laboratory. There, instead of being assigned to a permanent position, he is transferred from job to job until he has covered the entire scope of the laboratory. During this time he also keeps careful notes on all procedures for analyses and, even more important, instructions for correlating laboratory results with operating procedures to obtain their highest possible quality in the finished product. When he has covered the entire scope of the laboratory he spends a short time working on development problems or customer complaints. Then he is ready to be transferred to the research laboratory or the service or sales departments, or whatever position he has been in training to enter.

The apprentice in mechanics goes through a similar training program in which he becomes acquainted with all the different phases of the mechanical division. He works on various jobs in the different shops: Machine, carpenter, blacksmith, metal, electrical, paint, and so forth. He is taught how to repair motors, fit pipes, install and adjust meters. He learns boiler and powerhouse operation and water purification. In short, he learns everything that will make him an A1 repair man around the plant. When he completes his apprenticeship he is given a permanent position in the mechanical devision.

What It's Worth

What then, is the value of such a student training program to an employer? What will be the return on his investment in two years of comparatively nonproductive employment? He has, as a result of this training, a young engineer capable of stepping into a supervisory position in any part of the plant, one who not only understands the work of that particular department but also its relationship to the rest of the organization. Morever, it makes it possible to place in responsible positions men who have had the benefits of the most recent theories of engineering in college and will be able to apply them to their present problems to great advantage.

Coffee Preserved by Freezing

Frozen immediately after grinding, stored at zero and distributed house-to-house in refrigerated trucks. Better and cheaper than vacuum packing, is claim

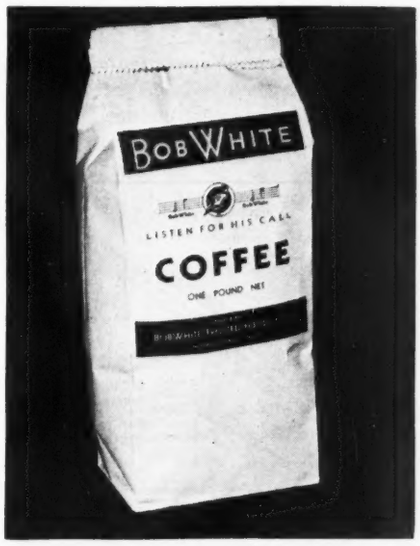
"FROZEN" granulated coffee is being sold house-to-house by BobWhite Frosted Foods Corp., New York. The purpose of freezing is to preserve the freshness, and, according to Mr. A. C. Jones, BobWhite's president, the method not only is more effective than vacuum packing but is considerably less expensive.

Still experimenting with the proper blend, the company started in April to distribute the frozen coffee in its Plainfield, N. J., unit, which serves 15 towns. Two weeks later the operation was extended to the company's other units.

In its operations at Plainfield, the company buys its coffee already roasted from a firm in New York and trucks the products directly to Plainfield. There it is promptly ground, packaged and frozen. Only a few minutes elapse between grinding and freezing, the purpose of haste being to preserve quality. Ground to two different degrees of fineness—drip and percolator—the coffee is filled into 1-lb. paper bags by machine and immediately moved into the freezing room. There it is frozen in two hours at a temperature of −15 deg. F., in air circulated by fans. When frozen, the packaged coffee is transferred to the storage room, where the temperature is zero deg. F., to be held until required for distribution.

The coffee is taken from the storage room as required and loaded onto the company's refrigerated trucks for house-to-house sale with the other items of the BobWhite line. And coffee that has not been sold at the end of the day remains on the trucks, as do the other products. This saves the labor of unloading it and putting it on the trucks again next day. And no harm is done since the temperature of the trucks is maintained at zero night and day. About 50 lb. of dry ice is consumed per truck daily, the truck bodies being 1-ton units heavily insulated with 6 in. of glass fiber on the sides, 14 in. on top and 10 in. of cork on the bottom.

As the volume of its frozen coffee sales expands, the company plans to do its own roasting, as well as grinding, at the distribution centers.



It's frozen coffee, though it looks like any other coffee. The paper bag is of the type regularly used for coffee, having an oil-proof liner.

The price of the frozen coffee delivered to the housewife is 29 cents a pound. The cost of freezing is placed at $\frac{1}{3}$ cent a pound and the cost of the regular 1-lb. paper coffee bag is about $\frac{3}{4}$ cent each. The company says that its frozen coffee costs at least 4 cents less per pound to produce than the same coffee vacuum packed in tin cans.

When the experimental work was started on frozen coffee, the product was packed in paper bags lined with rubber hydrochloride, and the lining of the bags held up satisfactorily at the low freezing temperature. But with the product frozen, the company has decided that a standard paper coffee bag is all that is needed.

The frozen granulated coffee is loose, not caked, being the same in this respect as unfrozen coffee. It is ready for immediate use. BobWhite recommends that the housewife keep it in her refrigerator to preserve the fresh quality until the product is all consumed. But the coffee can be kept on the shelf, as is done with other coffee, if the housewife desires.

After nearly a year of experimenting and testing frozen coffee, the company believes the product to be a natural for its operations. First, coffee has long been sold house-to-house. And secondly, the freezing and distribution in refrigerated trucks brings the coffee to the housewife "as fresh as if it had been roasted within the hour."

Green coffee contains about 30 percent of essential oils, and the roasted product about 35 percent. After the coffee is ground, the oils are exposed to air and start to develop rancidity, this rancidity, or staleness, being detectable by taste after seven days. Freezing the coffee stops the development of rancidity, the same as with frozen fish or meat, according to BobWhite.

In addition to the unit at Plainfield, BobWhite has two distributing units in Ohio, three in Pennsylvania, and one in New York state, with units scheduled to open in Baltimore, Pittsburgh, Springfield, Mass., and in the state of Washington. In all, it now operates something more than 100 trucks, these selling house-to-house in middle-class residential sections.

BobWhite's Cleveland unit, one of the places where coffee is ground and frozen.

How to Measure Bulk Quantities of Liquids

Part II — Temperature measurement, compensation of volume for temperature, relation of volume to weight, effect of separated solids and other factors

By NEAL M. CARTER, *Pacific Fisheries Experimental Station, Prince Rupert, B. C.*

Temperature Measurements

IN making any desired corrections for the effect of temperature on a measured volume of a bulk quantity of liquid, as described in the following section, it is necessary to ascertain the temperature with some care since the volume of some liquids can change by as much as 0.1 percent with a change of 1 deg. F. in temperature. If the temperature is suspected of being nonuniform throughout the contents of a tank, particularly if the tank is exposed to unequal temperatures at its sides or top and bottom, the temperature of the contents should be read at an even number of symmetrically distributed points and an average taken. In extreme cases of "layering" (*i.e.*, a hot layer over a cold layer of liquid) the contents should be considered as two separate volumes, each having its own (average) temperature.

Compensation for Temperature

Contraction during cooling, and expansion during warming, are phenomena displayed by all liquids that do not possess a maximum density while still in the liquid state. If such a maximum density exists, it occurs at a temperature usually not far removed from the normal freezing temperature of the liquid; *below* the temperature of maximum density the liquid *expands* on further cooling (or contracts on being warmed up to it). Many liquids either do not display this maximum density, or else it occurs at a temperature too low to be of interest in the commercial handling of such liquids. Water, however, exhibits a maximum density at 39.2 deg. F. and therefore expands on being either warmed or cooled from 39.2 deg. F., and contracts on being either warmed or cooled towards this temperature. *Dilute* solutions of salts in water (*e.g.*, seawater) and of certain liquids in water (*e.g.*, vinegar) also display a maximum density at a temperature somewhat below 39.2 deg. F. It must be emphasized that the above remarks apply only to the *liquid state;* a liquid may expand *or* contract when passing into the solid state.

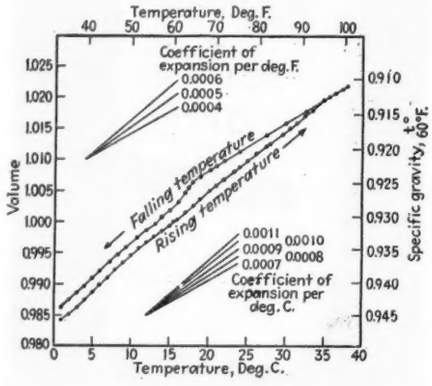


Fig. 3. Expansion and contraction of an oil containing stearine.

Thus, water at 32 deg. F. expands 9.075 percent of its volume when freezing to ice at 32 deg. F., and ice contracts 8.320 percent of its volume on melting. Some dilute aqueous solutions also expand on solidifying, but most organic liquids (*e.g.*, pure acetic acid, benzene) and some concentrated aqueous solutions contract on solidifying. Almost without exception the resulting solids contract on further cooling and expand on warming to their melting point.

For a given change in temperature, the corresponding change in a unit volume of liquid varies with the nature of the liquid and frequently varies also with the position of the temperature range on the scale of temperatures. This is exemplified by Fig. 2, which shows the alteration in volume with change in temperature when a unit volume (*e.g.*, a gallon or cubic foot) of various typical liquids and solutions at 60 deg F. is cooled or warmed.

From the central portion of this figure it is readily seen that warming one gallon of 95 percent ethyl alcohol from 60 to 100 deg. F. results in a volume increase of 0.025 gal., or 2.5 percent; whereas warming one gallon of 50 percent caustic soda solution from 60 to 100 deg. F. results in a volume increase of only about 0.011 gal. (1.1 percent). Furthermore, since the volume-temperature relation of this caustic soda solution is linear, the *percentage* increase in volume for a given temperature difference is the same irrespective of where the temperatures lie within the range shown. That is, the expansion is directly proportional to the rise in temperature.

For water, or a 26 percent sodium chloride solution (saturated solution of common salt), the case is different. A gallon of water expands 0.006 gal. (0.6 percent) on warming from 60 to 100 deg. F., but the next 40 deg. F. rise in temperature (100 to 140 deg.) causes an additional expansion of 0.010 gal.; therefore, the expansion is *not* proportional to the rise in temperature.

This proportionality or non-proportionality obviously applies also to contraction on cooling.

The exact relation between the changes in volume of many liquids with changes in their temperature is complex, but a very close approximation to the volume V_t of a liquid at t deg. F., when its volume V_T (in the same units) at T deg. F. is known, is given by the expression

$$V_t = V_T [1 + K (t - T)] \qquad (1)$$

where K is the *coefficient of volume change per degree Fahrenheit* that applies over the temperature range t to T deg. F. This coefficient may be looked upon as a "proportionality" factor relating volume change to temperature change, and from the foregoing remarks combined with an inspection of the different lines of Fig. 2, it is evident that K varies with the nature of the liquid. The steeper the slope of the line, the smaller the value of K. The "key" in the lower right corner shows the value of K per degree Fahrenheit corresponding to the various slopes for the different typical liquids considered, and indicates that K may have any value from 0.0000 to 0.0007 per degree Fahrenheit. If tem-

peratures on the Centigrade scale are used instead of Fahrenheit temperatures,

K per deg. C. $= 1.8 \times K$ per deg. F.

This distinction must be emphasized, since tables giving the values of K for different liquids frequently refer to its value per degree Centigrade.

If the expansion or contraction of a liquid is directly proportional to the change in temperature over a considerable temperature range (*e.g.*, oils, petroleum products and concentrated solutions such as have straight-line plots in Fig. 2), then K is practically constant over that range. If the expansion or contraction is *not* proportional to the change in temperature (*e.g.*, water and dilute aqueous solutions such as have curved plots in Fig. 2), then K is *not* a constant, but varies with the temperature. Thus, for water (an extreme case):

Temperature range	Value of K
32 to 33° F.	−0.000035
39 to 40° F.	+0.000000
49 to 50° F.	+0.000045
99 to 100° F.	+0.000206
149 to 150° F.	+0.000310
199 to 200° F.	+0.000396

Equation (1) serves to calculate changes in volume on both cooling and warming, providing due regard is paid to the algebraic sign of all the quantities involved. The value of K for some of the liquids shown in Fig. 2 may be found with sufficient accuracy by means of a parallel ruler and the key given in the figure; when the line is curved, the K corresponding to the *average* slope of the line between the temperatures t and T deg. should be used. For liquids not shown in Fig. 2 and for which the value of K is not known, it may be determined by measuring accurately the volume, density or specific gravity of the liquid at two different temperatures within the temperature range for which equation (1) is needed. If V_t and V_T are the measured volumes at temperatures t and T deg. F., respectively, then as a very close approximation,

$$K = \frac{V_t - V_T}{V_T (t - T)} \qquad (2)$$

When K varies appreciably with the temperature, as in dilute aqueous solutions, an approximate *average* value applying to the temperature range t to T deg. is

$$K = \frac{2 (V_t - V_T)}{(V_t + V_T) (t - T)}$$

For finding K from densities or specific gravities, see equation (3).

Relation of Volume to Weight

Density (D) is the direct expression of "heaviness" or weight per unit volume of a liquid, and its numerical value for any given liquid depends on the temperature, which must be stated, and the units used. The bare statement that a liquid has a "density of 0.986" is incomplete; "$D^{70°F.} = 0.986$" implies the conventional units and means that *one cubic centimeter* (c.c.) of the liquid weighs 0.986 *grams* (gm.) at 70 deg. F. If other units are used, they should be indicated. The following conversion factors for expressing density in various units are useful:

Pounds per U.S. gal. at $t°$ = density (gm. per c.c.) at $t° \times 8.345$
Pounds per Imp. gal. at $t°$ = density (gm. per c.c.) at $t° \times 10.022$
Pounds per cu.ft. at $t°$ = density (gm. per c.c.) at $t° \times 62.430$

Specific gravity (S), on the other hand, is the relative density of a liquid at some temperature as compared to the density of water at the same or some other temperature:

$$\frac{\text{Wt. of a vol. of liquid at } t°}{\text{Wt. of the } \textit{same} \text{ vol. of } \textit{water} \text{ at } T°} = S_{T°}^{t°}$$

Specific gravity is therefore independent of any units except temperature. The statement that a liquid has a specific gravity of $S_{50° \text{ F.}}^{70° \text{ F.}} = 1.327$ means that any given volume of that liquid at 70 deg. F. weighs 1.327 times as much as the same volume of water at 50 deg. F.

In commercial usage of specific gravity the reference temperature T is generally taken as 60 deg. F., and is therefore implied in the somewhat loose statement "specific gravity at 80 deg. F" which actually means $S_{60° \text{ F.}}^{80° \text{ F.}}$ The numerical relation between specific gravity and density values is:

$$S_{T°F.}^{t°F.} = \frac{D^{t°F.} \text{ (in gm. per c.c.)}}{\text{density of water in gm. per c.c. at } T° \text{ F.}}$$

Hence for any liquid,

$$S_{60° F.}^{t° F.} = 1.0010 \times D^{t° F.}$$

or conversely,

$$D^{t° F.} = 0.99904 \times S_{60° F.}^{t° F.}$$

It also follows that

$$S_{39.2° F.}^{t° F.} = D^{t° F.}$$

Likewise,

Pounds per U.S. gal. at $t°$ = sp. gr. at $_{60° \text{ F.}}^{t° \text{ F.}} \times 8.337$

Pounds per Imp. gal. at $t°$ = sp. gr. at $_{60° \text{ F.}}^{t° \text{ F.}} \times 10.012$

Pounds per cu.ft. at $t°$ = sp. gr. at $_{60° \text{ F.}}^{t° \text{ F.}} \times 62.370$

Densities or specific gravities can be ascertained by actual weighing of known volumes of liquids, but are usually determined by means of density or specific gravity hydrometers. The latter are generally calibrated to give the value $S_{60° \text{ F}}^{60° \text{ F}}$ when immersed in a liquid at 60 deg. F.; if the liquid is at some other temperature t deg. F., the reading will be $S^{t° F.}{}_{60° F.}^{t° \text{ F.}}$

Surface tension effects, parallax and changes in volume of the hydrometer cause slight errors. Many other types of hydrometers, such as salometers, Baumé, Twaddell, Brix, saccharometers, etc., are in use for special purposes. The relation of their readings to densities or specific gravities may be obtained from tables.

To find the density $D^{T°}$ of a liquid at temperature T deg. when only its tem-

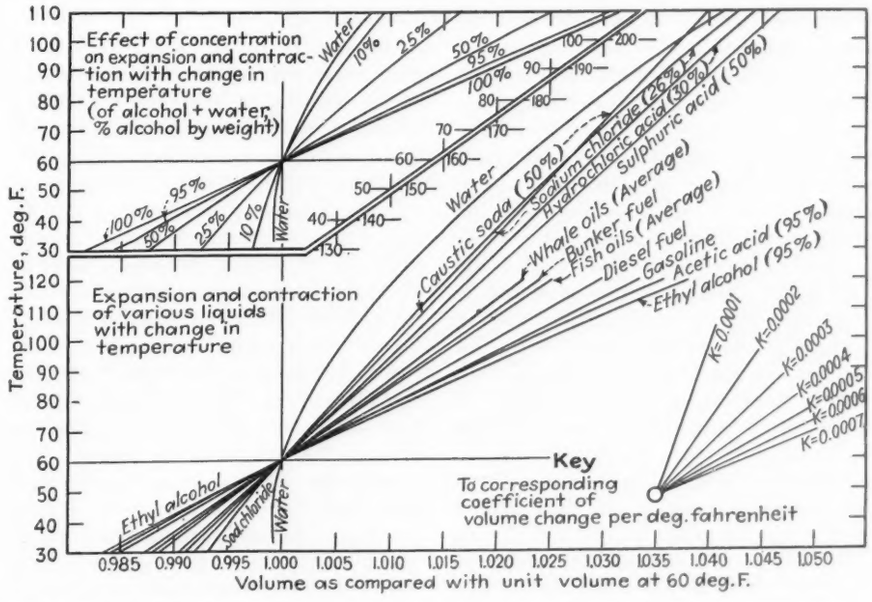


Fig. 2. Expansion and contraction of various typical liquids with changes in temperature.

perature $D^{t°}$ at temperature $t°$ is known, a very close approximation formula is

$$D^{to} = D^{to}\,[1 + K\,(t - T)] \quad (3)$$

where K has the same significance and limitations that apply to equation (1). In equation (3), D may be replaced by S, or any expression of density such as pounds per gallon, pounds per cubic foot, tons per tankfull, etc. A transformation of equation (3) provides another means of ascertaining K by measurement of the density (or specific gravity) at two temperatures t and T deg.:

$$K = \frac{D^{T°} - D^{t°}}{D^{t°}\,(t - T)} \text{ or}$$

$$\frac{2\,(D^{T°} - D^{t°})}{(D^{t°} + D^{T°})\,(t - T)}$$

The latter form is preferable when K is to be applied to dilute aqueous solutions over a temperature range between $t°$ and $T°$.

Effect of Separated Solids

It has already been mentioned that with few exceptions (*e.g.*, water) a given weight of liquid just above its freezing point occupies appreciably more volume than when just frozen. Individual pure liquids have definite freezing points; but many solutions and mixtures of liquids, such as natural oils, have no definite freezing or melting point, so that freezing or melting of one or more components can be taking place while the main bulk of the material is still liquid. This introduces anomalies in the relations between the temperature and the volume, density, specific gravity and coefficient of volume change (K) of the whole (*i.e.* liquid plus solids).

In a fatty oil the solids (stearine) separating or melting always occupy less volume than the liquid oils from which they are formed; the contraction on solidifying can be as much as 14 percent. Therefore, the normal rate of decrease in volume and increase in specific gravity on cooling of the liquid components (or rate of increase in volume and decrease in specific gravity on warming) is in effect accelerated by the presence of these solids. In either case, the result is an *increase* in the value of K.

Another important consideration is the fact that although a substance cannot be heated above its melting point without melting, it can, however, be cooled below its freezing point without freezing. This latter phenomenon (supercooling) is common in vegetable, animal and fish oils and leads to the interesting observation that a given weight of a certain oil at a definite temperature may exhibit volumes or specific gravities differing by as much as 0.5 percent depending on whether the oil remains completely liquid on cooling, or contains much solid on standing or warming to that temperature. In some experiments on herring oil that was being very slowly cooled and warmed, the author found the following values for $S\,^{60°F.}_{60°F.}$:

Clear oil, supercooled during cooling to 60° F.	0.9246
Oil plus separated stearine, on standing at 60° F.	0.9281
Oil plus stearine, after being cooled to 32° F. and then warmed to 60° F.	0.9308

The behavior of this oil on cooling and warming is shown in Fig. 3. On cooling, the oil (K = about 0.0004 per deg. F.) remained liquid (super-cooled) to about 65 deg. F.; then a sudden separation of some stearine caused an increase in K between 65 and 60 deg., below which stearine continued to separate (K = about 0.0006). On warming, K remained almost constant at 0.0006 until the last of the stearine melted at about 90 deg. F., above which the characteristics of the liquid oil were regained. The wide difference between the temperature at which stearine first appeared on cooling, and the temperature at which the last stearine melted on warming, is of particular significance.

The change in K with change in physical state of liquids such as the oil just described depends on the percentage of solidified components present and no definite rule for choosing the appropriate K can be given. Instead of altogether ignoring this change in K when compensating volumes, or weights per volume, for temperature differences, a more accurate value will be obtained if the K for the liquid oil is increased by 0.0001 to 0.0002 per degree Fahrenheit according to whether the amount of separated solid is known to be small or great at the temperature of measuring the volume of material.

The density or specific gravity of a pasty mass cannot readily be measured by the ordinary means; hence after the volume at the prevailing temperature is found and corrected to the standard temperature of (say) 60 deg. F. by equation (1), the density or specific gravity at 60 deg. F. to be used in foregoing expressions for calculating the weight must be ascertained on a sample of the oil when *fully liquid*. This sample should be made representative of the total bulk of material by drawing a few "core" samples extending from top to bottom of the tank to include the proper proportions of such solids as may be present. The samples are then mixed and heated until fully liquid and the density or specific gravity is measured actually at 60 deg. F. (or at some convenient temperature, with correction for temperature by equation (3) using the K for the *liquid* oil). Finally, the weight of the volume of oil is best stated as so many pounds per gallon (or cubic foot) at 60 deg. F. "in the liquid state." This added stipulation removes one of the main causes of later misinterpretation of abnormal volumes, densities, specific gravities or weights, due to separation of solids.

Other Factors

It may be necessary under some circumstances to take into account additional factors affecting the ascertainment of the quantity of liquid held in large tanks. Certain of these factors are difficult of estimation, others may be ruled out by simple obvious expedients, while some may cancel others.

1. Froth may obscure the true liquid surface. The volume of liquid in even a fairly thick froth is usually an insignificant proportion of the volume of the froth, and measurements should be based on the true liquid surface.

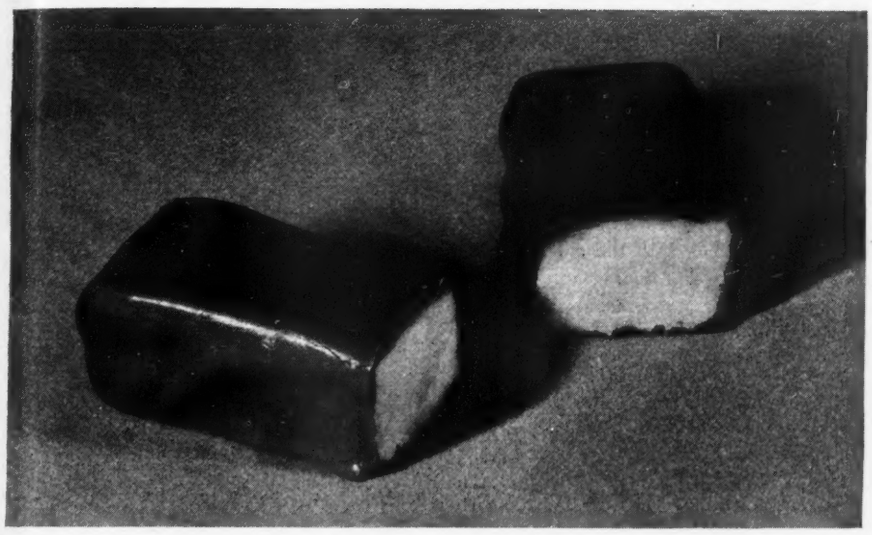
2. Suspended bubbles in freshly pumped viscous liquids, or in recently pumped liquids that become viscous on rapid cooling after pumping, may increase the true volume of the liquid by quite an appreciable amount. In an actual experiment with an oil that had been violently agitated with air and then allowed to stand for a short time, the author found that the volume of oil plus bubbles was still 0.4 percent greater than the volume of the oil alone, at the same temperature.

3. Expansion and contraction of a container with changes in temperature of the contents alters its capacity. For any upright tank such as listed in Table II, where the horizontal dimensions were ascertained at a temperature of t deg. F., the *observed* height H_T of the liquid contents at temperature T deg. F. will be 200 B $(T-t)$ percent too *low* if T is greater than t, or 200 B $(t-T)$ percent too *high* if T is less than t. The value of B (the coefficient of linear expansion per degree Fahrenheit for the material of the tank) varies from 0.000002 to 0.000005 for wood parallel to the grain, and glass; 0.000005 to 0.000008 for iron and steels; 0.000009 to 0.000012 for copper, brass and bronze; 0.000014 for lead; and 0.00002 to 0.00003 for wood across the grain. The maximum probable discrepancy would be of the order of 3 gal. per 1,000 gal. for a temperature difference of 100 deg. F., an amount that is about doubled when H is measured on a gage scale of the same material as the tank.

4. Deformation of containers may occur when filled. This effect depends on the shape of the tank, its material, the extent of reinforcement, and the specific gravity and temperature of the contents.

(*Turn to page* 123)

New Packages & Products



State College to stimulate consumption of these nutritive farm products. Originated by C. A. Iverson, head of the dairy department, the candy bar has a ratio of milk solids to sugar solids eight times greater than milk chocolate and nearly twice as great as sweetened condensed milk.

The bar as it now retails weighs 2 oz. and contains the equivalent in milk solids of one glass of 4 percent milk, plus a small amount of corn sirup and the chocolate coating. Although the bar now has a local distribution, Professor Iverson has had the procedure of manufacture standardized to encourage the confectionery industry to manufacture and distribute the bar with its line of candy products.

Heat-sealed End Labels

RUHLE'S HOME LEADER BREAD is one of the loaves now on the market with a new type of end label. The heat-sealing technic to fasten end labels on wrapped loaves of bread is of particular interest to packaging men because the process has a possibility of application to other food products. The process, the result of technical engineering experiments of both paper and machinery manufacturers, represents the use of a new label adhesive which is sanitary, odorless and tasteless. When used over the end folds of bread wrappers, the end labels help to seal the bread tightly against moisture-vapor loss.

End-label application is entirely automatic and is part of the usual bread-wrapping routine. The package to which the end labels are to be applied is preheated before it contacts the coated surface of the label. The coating, having a low fusion temperature, becomes slightly sticky.

The package picks up the label and carries it to the final heating unit and the label is tightly sealed.

The seal applies equally well to transparent cellulose, waxed paper or other bread wrappings. Use of the end label in bread wrapping is said to reduce the number of rewraps, seal returns due to imperfect end closures, width of paper required to seal and ink cost. End labels may also tend to reduce stale returns.

Milk and Honey Candy Bar

A CANDY BAR of milk and honey has been introduced by the dairy division of Iowa

Can Which Heats Itself

SELF-HEATING SPAGHETTI, beans with pork, and ready-to-drink coffee are being marketed by the Hotcan Corp. of Los Angeles, which packs the product in a can within cans of chemicals. When holes are punched through the chemical containers, the chemicals mix and generate heat, and within 15 minutes the contents are thoroughly heated. The "Hotcan" is turned upside down before punching the holes and then inverted for opening, as illustrated in the panel on the label.

The ready-to-serve products have a potential market among hunters, fishers, picnickers and others who can now enjoy a well-cooked meal without the time and trouble of preparing their own food.

Refrigerated Trucks Find New Use

Adapted to delivery of beer in kegs by special body design. Brewer capitalizes by advertising brewery-fresh beer

IN keeping with the trend to employ refrigerated truck bodies to protect food products on the last lap of their distribution from local warehouses to wholesale outlets, there now comes a refrigerated brewery truck for the delivery of beer in kegs. A fleet of nine such trucks is in the service of Oertel Brewing Co., Louisville, Ky.

It is a far cry back to the days of the early 1900's when the first trucks employed in keg-beer delivery were fitted with open-topped, low-sided, flareboard bodies such as had been used for years on the two- and three-horse brewery wagons. In those bodies the kegs were loaded, tier on tier, usually with no protection or covering of any kind. But in extremely hot weather, the load was sometimes protected by a tarpaulin cover, wet down with water in a more or less makeshift attempt to keep the kegs on the bottom of the load cool until they were delivered.

As the competition in beer sales increased and the art of truck body building advanced and broke away from established ideas and the influence of the old horse-wagon body designs, keg-beer bodies with permanent roofs but with open sides came into use. These were followed by bodies with the sides closed in and with side doors and stakes chained together to prevent the kegs from falling out while the trucks were in transit. Similar chained-stake, open rear ends were employed so that the kegs could be delivered from either the right- or left-hand side (on one-way streets) and from the rear as well.

Two-part Body Used

The preceding paragraphs sketch briefly the development which lies behind the Oertel body. This new body is a two-part body, the front part in the form of a regulation insulated and refrigerated panel body, and the rear part an open, stake-sided and stake-ended body. The special design of the body was originated by the Grave Truck Body Co., Cincinnati, in collaboration with the engineers of the Oertel Brewing Co. after a careful study of the delivery requirements.

The front refrigerated section of the body has these inside dimensions: length, 115 in.; width, 88 in.; height, 60 in. It will carry a load of 40 half-barrels of beer.

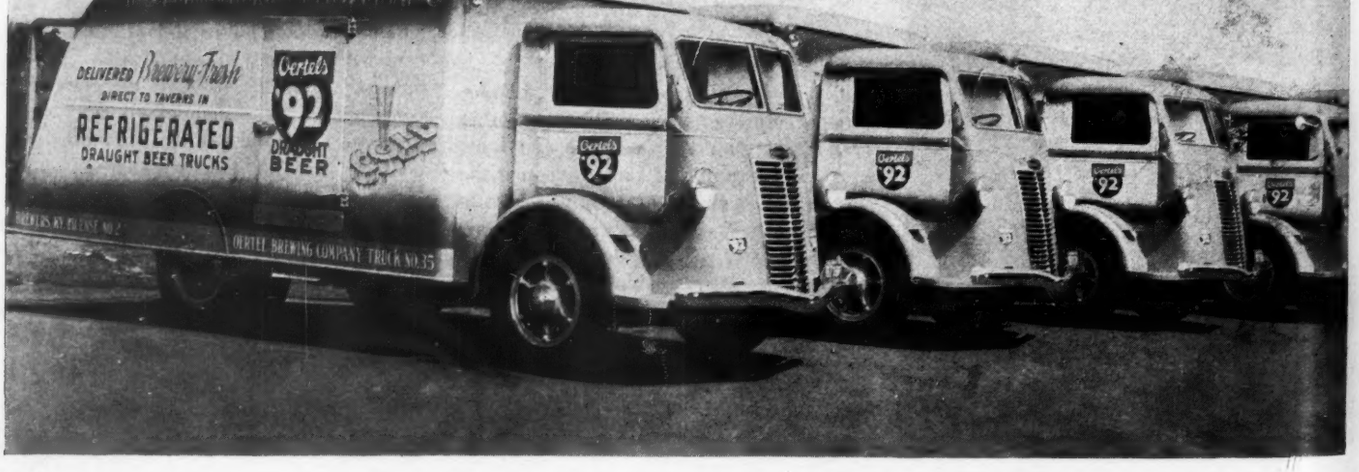
The trucks are used exclusively for the delivery of keg beer to taverns in Louisville. Each truck covers from 30 to 50 miles per day. The composition of the load varies somewhat in accordance with the orders to be delivered and the proportion of kegs, barrels or half-barrels. However, the average load is approximately 40 packages or units.

Access to the refrigerated compartment is through a conventional refrigerator-type door on the right side of the body. The sill of this door is protected by a "Diamondette" steel rub plate. A steel step is also provided under the door below the bottom of the body skirt to make it easy for the driver to get in and out of the body.

The insulation of the refrigerated compartment consists of 2-in. blankets of "Dry Zero" in the sides and ends and a 4-in. layer of "Dry Zero Bound Batt" in the roof.

Water ice is used as the refrigerant.

Seven of the fleet of nine cab-over-engine Autocars with refrigerated bodies used for the city delivery of beer in kegs by the Oertel Brewing Co. in Louisville, Ky. Each body has a refrigerated compartment at the front end capable of carrying a load of 40 half-barrels of beer and an open section at the rear for returning empty containers to the brewery.



One of the Oertel refrigerated-body beer trucks, showing the side door to the interior of the refrigerated compartment and the lettering tie-up with the type of body employed. Also note the painted icicles to suggest the coldness of the beer as delivered.

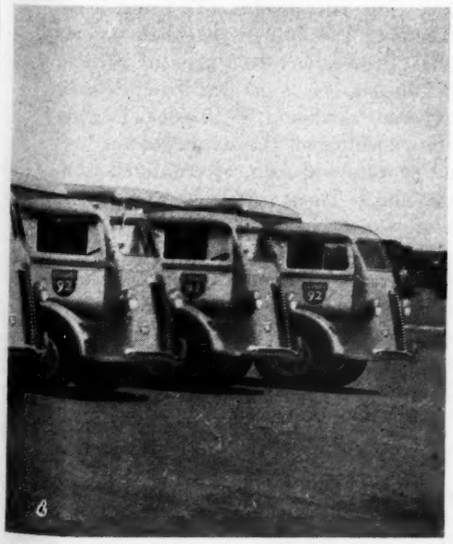
This is carried in bunkers with a capacity of 300 lb. These bunkers are filled through the side door of the body and drain off through the body floor onto the ground.

With the kegs precooled in the brewery cold storage room before loading into the truck, and with an average of from 30 to 40 side door openings during the course of the delivery route, the 300 lb. of wet ice refrigerant is sufficient to maintain an interior temperature of 44 deg. F. when the outside temperature is 90 deg.

While the trucks are, of course, used all year around, the refrigerant is not used in the winter or in the cool days of early spring or late fall. In the extreme winter weather, however, the closed section of the body prevents the beer from freezing while in transit.

The open rear section of the body is 60 in. long and 88 in. wide. It is used to return to the brewery the empty containers picked up at the time the full kegs or barrels are delivered to the Oertel customers.

The method of joining the front refrigerated compartment with the open rear section of the body is well shown in the above view of the Oertel truck Note also the construction of the rear stake section and the recessed step to facilitate the loading of empty containers.



One unusual feature in the design of the body is the manner in which the rear of the refrigerated compartment and the front of the open rear section are joined so as not to give the front compartment the appearance of a box at the front end of the truck.

As shown in one of the illustrations, this is done by continuing the side panels of the refrigerated compartment all the way back to the rear of the truck. These panels are not insulated, however, beyond the transverse rear end of the refrigerated compartment.

And further, to get away from a box-like rear end, the extended side panels are cut off at the top and continued down to the level of the bottom of the body skirt in an inclined straight line with a graceful joining curvature at the top.

Side stakes, inserted inside the extended side panels to give rigidity, project beyond the inclined panel line at the rear. Transverse stakes chained together keep the empties from dropping off the truck while in transit.

The other features of the rear-end construction include a heavy plated rear bumper on a line with the bottom of the side body skirting and above this, at the center, a large recessed step, the top of which is level with the floor of the open section of the body. This step tends to speed up the loading of the empty containers from the sidewalk level.

In the painting and lettering of the truck, full advantage has been taken of its unusual construction. Mounted on an Autocar C.O.E. (cab-over-engine) chassis, the body is painted a light color with shadings top and bottom.

Along the upper roof moulding line on each side are painted hanging icicles to bring out the fact that the truck is refrigerated. This suggestion of coldness as represented by the refrigerated body is further accentuated by the lettering on the body, which states that the truck load is "delivered brewery-fresh direct to taverns in refrigerated draught beer trucks."

The Oertel house brand of "'92 Draught Beer" is prominently displayed in its trade-mark form, which is also repeated in a smaller size on each cab door.

In addition, the lettering includes, on each side, a reproduction of a tall glass of beer setting on cakes of ice in the form of the letters "cold."

Progress in Processing Salt Stock

Part III—Detailed directions for processing salted onions, salted cauliflower and salted peppers

By W. G. WORMLEY, *Mt. View, Calif.*

Processing Salted Onions

To process salted onions, the same method is used as in processing salt pickles. Test the onion brine to get the salt content of the onions themselves. Dump 750 lb. of drained salted onions into an oval process tank, and add enough water to reduce the salt content to 30 deg. Sal. When 30 deg. Sal. has been reached, drain off the first process water and add sufficient fresh water to reduce the salt content of the onions to 18 to 20 deg. Sal. The method of computing the amount of water to add is exactly the same as that described under salt pickles.

Use the steam siphon to heat the tank to 90 deg. F., and just before turning it off add 4 lb. of iron-free alum. Agitate well for one-half hour continuously, and at one-hour intervals thereafter for 10 hours.

After the process water is drained off, the onions are placed in vinegar or sweet liquor.

The labor cost is $0.60 per tank.

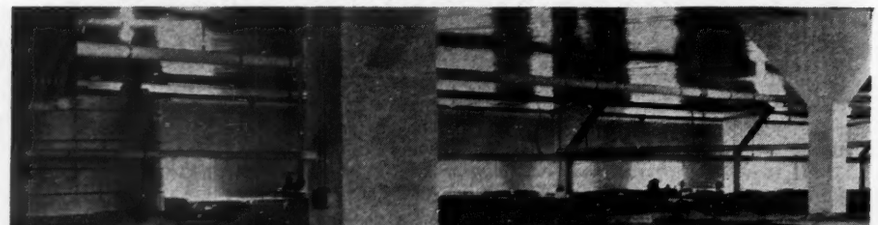
Processing Salted Cauliflower

For processing salted cauliflower the same general method is followed as for salt pickles. First test the cauliflower brine with a salometer. Then dump 750 lb. of cut cauliflower into an oval process tank and reduce the salt content by the same two-stage procedure, first to 30 deg. Sal., then to 18 to 20 deg. Sal. At the time of adding the second process water, place in the tank a loose cheesecloth bag containing 6 oz. of powdered turmeric. Agitate as before with the cypress paddle.

Process temperature for both first and second water for salt cauliflower is 100 deg. F. instead of the lower temperature (80 deg.) used for pickles. Just before turning off the steam from the second process water, add 4 oz. of powdered iron-free alum. Agitate thoroughly. When the brine test of the second process water reaches 18 to 20 deg. Sal., drain off the brine and wash contents of the tank thoroughly. Then cover the cauliflower with 60-grain vinegar. The cauliflower will be ready for use in 10 days.

Some packers prefer to process cauliflower in the whole heads rather than to cut it while high-salted. The procedure is the same, but it must of course, be cut "in vinegar," which wastes alum, turmeric and vinegar because of the inevitable waste of the stumps. Cauliflower cutting is very important and must be carefully done if the bottled product is to have a really fine appearance.

The labor cost for processing salted cauliflower is $0.60 per tank.



Oval pickle processing tanks supported on skids to make them portable. Portable tanks make for economy in utilization of factory space. Lift trucks transport each tank to the tank house for brine stock, then to a processing "station" to receive water, steam and agitation, and then to the finishing department.

Processing Salted Peppers

For processing salted pepper hulls the general procedure is the same as for processing salt pickles. Test the brine as before. Use 750 lb. of salted pepper hulls. Process in two stages to 30 deg. Sal., then to 18 to 20 deg. Sal. Process temperatures should be 100 deg. F. Just before turning off the steam for the second process add 4 lb. of powdered iron-free alum. Then agitate thoroughly as before.

When the 18 to 20 deg. Sal. test is finally reached, drain off the process water, rinse the pepper hulls well, and cover with 60-grain vinegar. The peppers will be ready to use in 10 days' time.

The labor cost is $0.60 per tank.

Mr. Wormley's next articles will deal with other phases of pickle manufacture, especially pickle finishing. Watch for them—THE EDITORS.

* Part I of this article was published in FOOD INDUSTRIES for January, 1941, page 58; part II, in FOOD INDUSTRIES for February, page 50.

Hints and Hurdles

Thurman Arnold Plans to Level Opposition to Federal Grades

THE CANNING INDUSTRY as a whole has turned a deaf ear to every attempt to introduce A, B, C grading on canned food labels. The industry has maintained a solid front.

In spite of industry's solidarity against A, B, C grades on canned food labels, 17 individual canners operating in eleven different states will operate under Agricultural Marketing Service's continuous inspection in 1941, and some of these are now marketing their products labeled according to U.S. grades.

The number of canning plants which have applied for the AMS service is reported as near 200. Many other canners have expressed approval of operations under AMS, and also an intention of filing application. Nevertheless, there is still definite opposition to grade labeling by the canning industry.

Thurman Arnold, U.S. Department of Justice, testifying before the House of Representatives on the hearing of the Justice Department Appropriation Bill, 1942, threw some light on this apparently inconsistent situation. Mr. Arnold's testimony reads as follows:

"Now let me give you a typical example of the sort of case where we will now get indictments: The Department of Agriculture induced six cannery companies to voluntarily grade their products and mark their products. An inspection was made by the Department of Agriculture so they could certify the grades of the products. Now the big distributors, about 16 of them, did not like this because it meant an interference with their method of advertising their products, because they load up with any old grade. Outside of chain stores, the buying is done through brokers. The bulk of it passes through brokers' hands, so these large distributors said to the brokers: 'If you act as a broker for anybody who sells government grades, we will not buy from you.' They said they would not buy from any broker who acted as a broker for anybody who used government grades. Of course, that will practically force them out of existence."

The House of Representatives has passed and the Senate is expected to approve an appropriation of $2,325,000, $25,000 more than Mr. Arnold asked for when he presented his own estimate of appropriation needs to the Budget Bureau. Mr. Arnold has threatened investigations in the field of food from processing through distribution of grocery items. He has intimated plenty of fireworks as the result.

There will be plenty of interest in the industry as, if and when Mr. Arnold carries out the program outlined above. The results of such an investigation will have considerable bearing on the attitude of the food industries, distributors and consumers toward canned food with AMS certification on the label.

Florida Uses Citrus Waste To Grow Fruit, Milk, Meat

ONLY A FEW YEARS AGO the only use for citrus peel, byproduct of Florida citrus fruit canners, was as fertilizer for the citrus groves and for the extraction of citrus oils. Frequently the discarded peel accumulated as a waste, attracting huge swarms of sour fruit gnats.

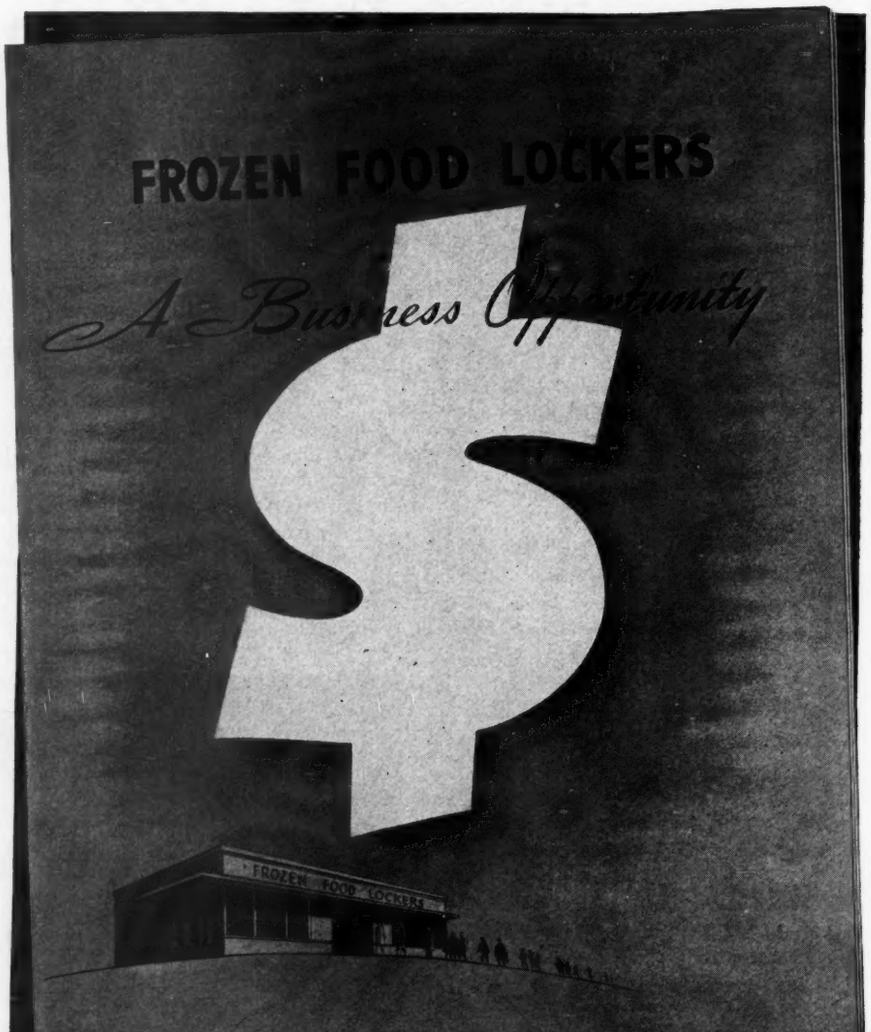
This season most of the waste of the canning plants will either be used to enrich the groves or will be converted into feed for cattle. All the waste of the canning plant to be converted to feed is pulped, usually in a hammer mill, and steam-dried for cattle feed. Citrus fruit byproduct plants this year will produce approximately 25,000 tons of cattle feed. Feed recovered from citrus canning plant waste has proved an economical as well as a satisfactory feed. Florida absorbs the present output of the byproducts plants. The herds show real improvement as the result of feeding on the citrus fruit byproduct.

COMPETITION FOR U.S. PACKERS

Argentine Meat Producers Association has adopted a new method for shipping precooked beef to this country. The roasts, cooked to U.S. government specifications, are removed from the oven and wrapped immediately in 170-gage rubber hydrochloride. An overwrap of tough paper is applied and the package placed in a wooden box. The boxed roasts are placed in a freezer where they are held until transferred to the refrigerator compartment of a steamer for shipment. Test shipments to both the U.S. and England indicate that use of the wrap prevents loss of flavor, oxidation of either fat or meat and discoloration or absorption of foreign odors. Above—applying the wrap.

ARE FROZEN FOOD LOCKERS YOUR PROFIT OPPORTUNITY?

HERE'S A BRAND-NEW, FACT-FILLED BOOKLET ON THE SUBJECT . . . AND IT'S YOURS FOR THE ASKING!



IF you're interested in the unusual opportunities in the frozen food locker business, you'll want this new Armstrong booklet. It's fully illustrated and offers facts you should know *before* you plan or build a frozen food locker plant!

For instance, you'll read about the general theory of locker plant operation . . . the value of locker service to farm and town dwellers . . . the various extra services a locker plant operator can sell . . . the original cost of modern plants . . . the average operating cost and profit possibilities for plants of several sizes. You'll also find a description of three types of locker systems! These include:

POLAR CHEST*—a modern system which offers comfort and convenience for patrons as well as maximum operating economy for operators. Lockers are raised from the storage compartment into a room at normal temperature where patrons have easy access.

POLAR WHEEL*—a newly developed automatic self-service "packaged unit" ideally suited for use in branch locker stations or for grocery stores and meat markets. The lockers are on a platform which revolves in a refrigerated room.

WALK-IN PLANT—Lockers in this type of plant are arranged in tiers in a refrigerated room, which patrons enter for access to individual lockers. Experienced Armstrong engineers can help you plan and build *any* of these three efficient types!

Don't miss the chance to get all the facts about these locker systems, and about dependable Armstrong's Corkboard Insulation which helps keep operating costs low. Fill out and mail the accompanying coupon, now, to Armstrong Cork Company, Building Materials Division, 916 Concord Street, Lancaster, Pennsylvania.

*Patented Armstrong Cork Company, Licensee

ARMSTRONG'S CORKBOARD INSULATION

ARMSTRONG CORK COMPANY
Building Materials Division
916 Concord St., Lancaster, Pa.

Gentlemen:

Please send me FREE, a copy of your new booklet—"FROZEN FOOD LOCKERS—A Business Opportunity."

NAME.....

ADDRESS.....

CITY.....STATE.....

The Food Industry News

GENERAL NEWS, BUSINESS TRENDS, MEN, JOBS AND COMPANIES • MAY, 1941

SMA Will Bolster Farm Prices To Build Emergency Food Pool

Department of Agriculture takes charge of food supply as plan for Food Supply Administration dies on President's desk

THE Department of Agriculture—particularly its Surplus Marketing Administration under Milo Perkins—is now firmly in the saddle for directing the nation's food supply program in this war. Scrapped entirely is the Food Supply Section within the defense administrative setup, which also means that that agency's proposal of an overall food supply administration (FOOD INDUSTRIES, April, page 68), has died (at least in the predictable future) on the President's desk.

The ruling policy of the Department is to put a floor under farm commodity prices. This floor is deliberately above the level of the recent past to provide a cash stimulant to farmers for hiking production.

The plan is also intended to insure a commodity price "ceiling" at or near the "floor" but this is a secondary objective. It will be in this zone of prices —the spread between the farmer's return and the retail level—where the new Office of Price Administration and Civilian Supply will operate.

Takes Direct Action

SMA is taking direct action on individual problems as they arise. The best sample of this to date is the campaign to increase the 1941 canned tomato and tomato juice packed by 50 percent—from 30,000,000 to 45,000,000 cases. Here again, the farmer "bonus" was the method adopted. Canners' representatives were called in and induced to offer $2.75 to $3 per ton more than the 1940 price to farmers, not only for increased yield but for their entire canning crop.

This "tomato formula" applies also, although the procedure is more fundamental, to the government's program for production of pork, dairy and poultry products, all of which are wanted by the British in large quantities. In these lines the government is in the market to support what it deems incentive prices for farmers, rather than arguing processors into voluntarily paying high prices. Thus, the Department plans to buy pork products to keep hogs at around nine cents at Chicago, dairy products in order to keep prices at a 31-cent level on butter, chickens at 15 cents and eggs at 22 cents.

Purchases thus made will be pooled by SMA and made available in four directions without a public breakdown: For continuing relief distribution programs; for British account under lend-lease; for Red Cross distribution in war areas where policy permits; and for resale on the commodity exchanges if prices get out of line.

Two Standards Issued, Two Hearings Pending

NO NEW DOCKETS were proposed up to April 21, but two proposed standards were issued as a result of earlier hearings. One of these, on flours, was printed in the April 1 *Federal Register*. The other was on oleomargarine, in the *Federal Register* for April 17.

Two hearings are still pending. The cheeses, including reconsideration of cream cheese and first consideration of neufchatel and cottage cheeses, were the subject of hearings which began April 21. The chocolate products hearing is scheduled to resume on May 12.

A tentative order on canned fruit dockets has been awaited for many weeks. The decision in the canned peach case will mark a significant step in the sweetener controversy. Tentative orders for dietary foods and habit-forming drugs are expected to follow sometime after the canned fruit and canned fruit cocktail orders.

Harris & Ewing

THEY WILL KEEP WATCH ON PRICES

President Roosevelt's newly created agency—an Office of Price Administration and Civilian Supply—went into action on April 12. This agency will exercise broad price-fixing powers in an effort to prevent runaway prices and inflation as a result of National Defense expenditures. Leon Henderson, seated at right, heads OPACS. Miss Harriett Elliott, seated at left, is a member, her Division of Consumer Protection being merged with the new agency. Dave Ginsberg, standing at left, is the general counsel for the agency, and John Hamm, standing at right, is the deputy administrator.

Trust-Busting in Food Field Heading for Big Expansion

House passes an appropriation of $2,325,000 for Thurman Arnold's activities, nearly double the funds for current year

Thurman Arnold's trust-busting activities in the food field are heading for a large-scale expansion. The House of Representatives has passed, and at this writing, the Senate is expected to approve, an appropriation of $2,325,000 for this division in the fiscal year beginning July 1. This amount is the largest in the history of trust-busting, nearly double the current year's funds.

Congressional liberality came after Mr. Arnold testified before the House appropriations subcommittee, giving promise of great things to come if only sufficient funds were available to make necessary inquiries and case preparations. Particularly, Mr. Arnold emphasized, his division intends to concentrate on activities in war industries, foodstuffs and building. He painted a picture showing that the division's activities bring in sufficient fines to more than pay its way, even at the increased appropriation, and singled out several instances where investigations and indictments had brought price cuts. In the food field, in the latter category, he mentioned the one-cent drop in Philadelphia area bread prices, the drop in grocery prices in Denver and the Chicago cut in milk prices.

Mr. Arnold told the committee he now has 35 men at work on his nation-wide food investigation, that 150 cases are under study with more than a dozen ready for presentation to Grand Juries. With additional funds, he said, this work would be materially stepped up.

Hints of things to come were supplied by Mr. Arnold in two instances. He told the committee his division planned to seek indictments of brokers and distributors whom he claims are "boycotting" AMS canned goods grade labels. He also promised action to break up a financing contract set-up between fertilizer companies and potato growers in North Carolina. Another line of inquiry in the Arnold dossier being kept carefully secret is into the purchasing and marketing activities of some cooperatives.

Army Names Buyers

THE War Department has announced that 28 of the 30 marketing specialists have been selected who are to aid the Quartermaster Corps in purchasing fresh fruit and vegetables for Army consumption. In the new "field ration" purchasing plan, specialists will be located at market centers throughout the country and will provide much greater opportunities for small producers of these farm products. A list of the marketing specialists, their offices, and the Army stations they serve can be obtained from the War Department, Washington, D. C.

Technologists To Talk On Vital Food Problems

Second annual meeting of IFT to be in Pittsburgh in June

THOSE who direct the technical operations in the food industries will gather at the William Penn Hotel in Pittsburgh on June 15 to register for the second annual meeting of Institute of Food Technologists, the sessions of which start on the 16th and continue through the 18th. The importance of this meeting is forecast by the success of the first IFT convention last year and by the rapidly growing need for greater technical knowledge in the food industries.

The technologists convening at Pittsburgh first will hear papers on their most recent problem, vitamin restoration and fortification. This will come on Monday morning. Monday afternoon, three divisional meetings will be held, one for general papers, one on packaging and storage and one on waste and byproduct utilization.

Another timely subject, food and national defense, will be the topic of the session on Tuesday morning. And on Tuesday afternoon there will be divisional meetings on bacteriology of sanitation, protection and improvement of flavor and process engineering in food manufacture.

The program for Wednesday has not been announced.

Prices of Commodities Are To Be Controlled

Action on steel prices taken as indication of what is ahead

IF ANYONE doubted previously that the government was going to embark on price fixing, they were completely disillusioned on April 16 when the first major price fixing order was issued by OPACS. That order from Administrator Henderson froze the prices of all steel products on the basis of the price schedules prevailing during the first quarter of this calendar year. Action was taken in order to prevent an upward spiral of industrial prices, many of which might have been influenced by greater cost of steel, Henderson explained.

It is expected that comparable price decisions will be imposed on food speculators suspected of taking undue profits during a period of upward price movement. Administrator Henderson and Consumer Commissioner Harriet Elliott, who is now subordinate to Mr. Henderson, and several other official spokesmen have not hesitated to speak frankly as to their intention on several occasions.

Harris & Ewing

FOOD-FOR-EUROPE PILGRIMAGE

By way of a stunt to propagandize food for Europe, a band calling themselves "Food for Europe Pilgrims" marched on the Capitol on April 11. Rev. J. Holmes, East Berlin, Conn., lead the pilgrimage, and presented a petition to the State Department appealing for food for war victims of the small countries of Europe. The pilgrimage is shown as it passed the White House.

Packaging Trends Influenced by War

Demands and restrictions of the defense program discussed at packaging conference

SIMPLICITY and versatility in the use of packaging materials and design of packages were emphasized at the Eleventh Annual Conference and Exposition held at Chicago, April 1 to 4. More than 800 registrants attended the conference sessions.

Demands and restrictions arising from the national defense program were cited at the conference as particular reasons why future packaging plans should be made to keep both the package and the packaging operations simple. Shortage of skilled machinists to make packaging machines is causing as much concern as is lack of structural materials. Packaging in large and standardized containers was recommended to reduce the demand upon raw materials and to make best use of existing machines. Wider utilization of transparent materials was suggested.

Trends in that direction are indicated by the reported 60 to 70 percent increase in production efficiency of glass-making plants and the 25 percent increase in plastics manufacture in 1940 over 1939, with a further anticipated increase of 50 percent for 1941.

What They Did in England

In recounting how warring countries are meeting their packaging problems, I. M. Sieff, vice-chairman, Marks & Spencer, Ltd., London, England, stated that packaging was one of the first uses for raw materials and supplies brought under government control. All modern ideas on packaging were scrapped, not because modern packaging was a luxury but because war conditions disrupted peace-time merchandising practices. Style and quality in packaging were definitely put on the downgrade. Control over raw materials during World War I was quite mild in comparison with present war controls, hence the restrictions placed on packaging arises from scarcity of raw materials. Paper is very much under control and carton elimination is being vigorously pushed. Use of tin-coated containers is denied where not considered an essential. Aluminum is denied to all not in war supplies manufacture. In respect to all restrictions, makers of packaged products for export are on the same preferential basis as makers of war supplies. Labels of full width and in color are permitted on canned foods if made from waste paper. Otherwise, merely identification stickers or bands have to be used. Simplification is the order of the day.

TO ADVISE BRITISH BUYERS
J. S. McLean, president of Canada Packers, Ltd., Toronto, Ont., is to be the principal trade advisor to the Food Mission which England is sending to the United States. He accepted last month the invitation of British Food Minister Lord Woolton to serve in that Capacity.

American Shortage Predicted

O. W. Luhrs, president, Container Testing Laboratories, Inc., New York, predicts a likely shortage of all types of packaging materials heretofore regarded as staples. Under war economy conditions there will have to be many substitutions of one kind or another.

Ralph W. Marquis, U. S. Forest Service, Washington, D. C., put in a plea for wider use of lumber for shipping containers as their use really conserves lumber which otherwise would likely be wasted. Cost is a relative factor dependent upon what is wanted or needed in a shipping container.

The exposition established a new record in number of exhibitors with a total of 86; an increase of 7½ percent over the 1940 high, with an increase of 12 percent in floor space used. Exposition registration was more than 8,000.

Berry Freezers In Spot

INFORMATION from the industry indicates that in some parts of the country packers of frozen strawberries in bulk may be forced to quit or curtail operations this season. It is said that the pay for cappers under the wage-hour law is so high the packers can't meet competition.

Cut Cost of Thiamine

HOFFMAN-LA ROCHE, INC., Nutley, N. J., Merck & Co., Rahway, N. J., and Winthrop Chemical Co., Inc., New York, N. Y., have announced increased production and lowered cost of thiamine in cooperation with the defense program.

Industry Surprised By Flour Standards

Mandatory use of riboflavin in enrichment formula was not anticipated by the trade

THE LONG AWAITED tentative order on flour standards was issued in the April 1 *Federal Register*. Interested parties had until April 21 to file formal objections to the proposed order. The Millers National Federation filed a brief on behalf of the industry, commenting on details of the standards.

Most surprising feature of the proposed standards was mandatory inclusion of riboflavin in the enriched flours. At the time of the hearings it was frequently mentioned that supplies of this material were both scarce and costly. It was suggested by members of the flour-milling industry that it be permitted but not required until such time as sufficient supplies were available for economic use.

Typical of the objections filed were the following:

The Dixie-Portland Flour Co., Memphis, objected to the mandatory use of riboflavin for the reasons stated above. Foster D. Snell, New York, requested permission to include one-quarter of one percent of bentonite, an inert clay product which was said to improve the baking properties of flour. The Fruen Milling Co., Minneapolis, objected to the definitions of cracked wheat, crushed wheat, whole-wheat flour and farina on the basis of size of granulation. That company also protested the exclusion of durum wheat from these products. Victor Chemical Works, of Chicago, also filed an objection, requesting permission to use dicalcium phosphate as a carrier for benzoyl peroxide, in addition to the permissible carriers disodium alum or calcium sulphate and magnesium carbonate.

Among other objections filed were those by Hecker Products Corp., and Standard Milling Co., both of New York; by R. R. Williams of National Research Council; by Quaker Oats Co., Chicago; and by Morris Mills, Inc., also of Chicago. After these companies had filed objections, ten more joined the list.

Freezes Cottage Cheese

COST of producing cottage cheese is said to be cut and its production stabilized by a method being worked out at a dairy in Los Angeles. This dairy freezes a cottage cheese base in 5-gal. containers and holds it in cold storage for later use. So when milk production is at its peak, a supply of the cheese base is laid by for use when milk production is low.

Chemical Methods for Vitamin Control Described at Meeting

Other aspects of fortification discussed. Effects of canning, freezing and dehydration on vitamins in beans revealed

A CHEMICAL METHOD has been developed which accurately measures the nicotinic acid content of both natural and fortified breads and flours. This was reported by Dr. Bernard L. Oser, Daniel Melnick and Louis Siegel, all of Food Research Laboratories, Long Island City, N. Y., at the symposium on vitamins held at the American Chemical Society meeting in St. Louis, April 7 to 11.

The procedure involves water extraction of the anti-pellagra vitamin under steam pressure, conversion of the nicotinic acid compounds to the free acid form, and measurement in a photoelectric colorimeter of the yellow color developed when the vitamin is allowed to react with cyanogen bromide and analine.

A method for the combined determination of riboflavin and thiamin in the same sample was outlined at the symposium by R. T. Conner and G. J. Straub, General Foods Corp., Hoboken, N. J. In brief, the method consists of the extraction of the food material with 0.04 *N* H_2SO_4, followed by enzymatic action with clarase. The extract is then centrifuged and an aliquot taken for the determination of riboflavin and thiamin. The thiamin is absorbed on activated Decalso, and the filtrate containing the riboflavin is passed through a column of Supersorb, where absorption of this vitamin occurs. The riboflavin is eluted from the Supersorb, the eluate purified and its riboflavin content determined fluorometrically. The thiamin is determined by the thiochrome procedure.

R. R. Williams, who took part in the vitamin symposium of the ACS meeting, expressed the opinion that artificial reinforcement should be limited to staple foods and kept within the bounds of those kinds and quantities of vitamins which are indigenous to the food in question. This view is based upon the consideration of the probable evolutionary history of human requirements.

C. A. Elvehjem gave a list of the daily requirements of the better known nutrients needed by man. It is as follows:

Protein	70 grams
Calcium	0.7 grams
Iron	12 mg.
Vitamin A	4,000-5,000 I.U.
Vitamin B_1	1.5 to 2 mg.
Vitamin C	50 to 75 mg.
Riboflavin	2 to 3 mg.
Nicotinic acid	10 to 15 mg.
Vitamin D	400 I.U.

These figures admittedly are limited in their value because of various factors such as different requirements for different age groups.

The effect of quick freezing, canning and dehydration on the vitamin B_1, B_2, and C contents of green snap beans was reported by Kenneth T. Farrell and Carl R. Fellers of Massachusetts State College. There was little loss of vitamin B_2 by any preserving process. In the case of thiamin in either canned or frozen foods the loss in 12 months was about 20 percent. Dehydrated beans lost only 15 percent of the thiamin in 12 month's storage. Blanching preliminary to either canning or freezing was of utmost importance in conserving vitamins B_1 and C. Beans lost about 75 percent of vitamin C due to canning. The loss due to quick freezing was 35 percent. Acidification of canned snap beans aided retention of the three vitamins.

Low-cost Flash Freezer Developed by University

A LOW-COST, light-weight, flexible quick freezing machine which "flash freezes" by immersion has been developed by Luis H. Bartlett at the University of Texas, according to a report from the University. Briefly, the freezer consists of a 9-in. pipe which escorts food and freezing medium from intake to exit around a 6-ft.-long elliptical route. A special "heavy" immersion medium, held by cooling coils at 2 deg. below zero, floats peas, beans, shrimp or citrus fruit segments, and the whole mixture is propelled through the freezer by a slowly rotating screw. No conveyor is used. Freezing time is a mere three minutes, and one operator can handle units that will freeze 5,000 lb. an hour. The cost of the unit is placed at $1,500, and it is said to use about 10 percent of the freezing medium needed for other immersion freezers. The unit measures only 5 x 8 ft.

For the time being the University will make the freezer and lease it to users.

New Oregon Food Law Follows Copeland Act

THE NEW Oregon Food Act, effective June 13, to prohibit adulteration and misbranding of foods, brings Oregon into line with the food provisions of the Federal act. In the revised Food Labeling Chart, Oregon now has the same regulations as to name and place of business, name and ingredients of food, quantity, quality and imitations, as the Federal statutory definitions.

Specifically prohibited under the Oregon Act are manufacture, sale or delivery, receipt, holding or offering for sale or any food that is adulterated or misbranded, false advertising, labeling

"He wants to know can he lick the tank."

or representation, and refusal to permit entry or inspection to authorized persons. Definitions and standards of the department, tolerances for poisonous ingredients, classification of food in transit for completion purposes, regulations and inspections are explained in the text of the Act, which repeals outmoded sections of the state's original food law.

Health of Europeans Threatened by Diet

UNLESS the civilian populations of many European countries are able to find food from sources other than the permitted rations, the health and lives of millions is definitely imperiled, according to calculations made by National Committee on Food for Small Democracies as of April 1 from the official rations of each of the principal countries. Health of the average person is sustained by a minimum of 2,200 calories per person per day. This contrasts with the calculated figures:

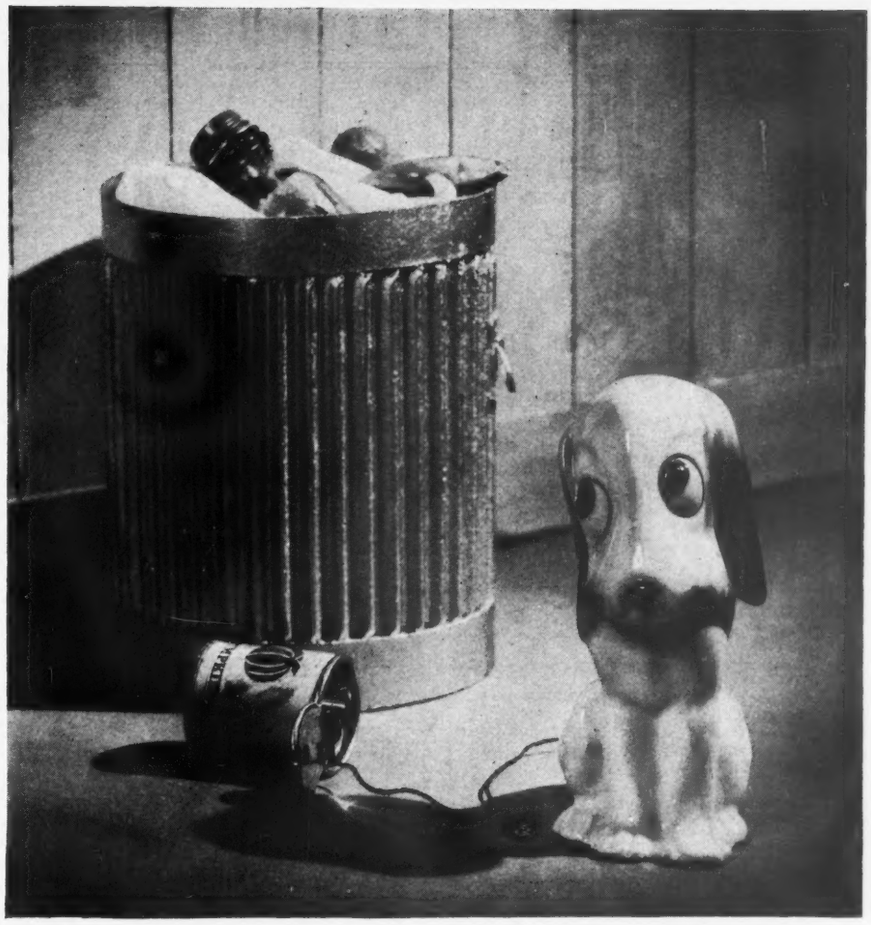
Poland	800 cal. per person per day
Belgium	960 cal. per person per day
Norway	1,500 cal. per person per day
Holland	1,900 cal. per person per day
Germany	2,500 cal. per person per day
England	2,800 cal. per person per day
United States	3,000 cal. per person per day

Regarding fats, the German civil ration is stated to be 30 percent below normal, but is still 30 percent above the minimum regarded safe from a nutritional viewpoint.

Standards Proposed For Oleomargarine

THE oleomargarine standards, as proposed in the tentative order of April 17, seem closely in harmony with the proposed standards of the margarine manufacturers early last year. The major difference is in the quantity of vitamin A required, if any be used. Prior to the hearing both the industry and the Food and Drug Administration proposed 7,500 U.S.P. units of vitamin A per pound of margarine. The tentative order calls for 9,000 units as a minimum, if any vitamin A is added. The amount actually added may be declared in units or not, as desired.

Oleomargarine may be made from animal fat or from vegetable fat, or from a mixture of the two. However, if a mixture is used, at least 10 percent of the lesser component is required as a minimum. Label declaration is required as usual for artificial colors, artificial flavors, and preservatives (sodium benzoate or benzoic acid) when used. Objections to the proposed order could be filed until April 27. The final order will be issued after consideration of any objections that may be received.

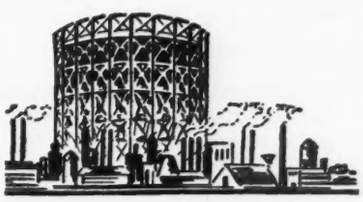


A DOG'S LIFE

Your job these days may make a dog's life seem downright attractive. But getting production *at a profit* is a lot easier in some plants than others.

That's why so many famous names in food depend on the Kemp Industrial Carburetor and Kemp equipment for quality control and economy in roasting, toasting, high-temperature cooking and can-making operations.

Fuel savings of 15 to 40 percent are the rule wherever Kemp equipment goes to work. Let us outline for you the scope of Kemp services and suggest what you may expect of Kemp in your job. Address the



C. M. Kemp Manufacturing Company . . .
405 East Oliver Street,
Baltimore, Maryland.

KEMP of BALTIMORE

Look in the Window at a New Merchandising Idea

WRAPPED BY OUR FA MACHINE

A new merchandising idea—individual TENDER LEAF tea balls packed in specially prepared Filter Paper which is tasteless, odorless and insoluble in boiling water. To acquaint the public with this new feature, Standard Brands uses a cut-out window in their package through which the consumer can see inside.

The TENDER LEAF packages are perfectly wrapped in transparent cellulose by our FA Machines. Note the fine wrapping job—neat, smooth and flawless, reflecting the quality of the product.

All four sizes of the TENDER LEAF packages at right are wrapped by the FA, showing its *remarkable adjustability.* On the FA, the change from one size to another takes only a few minutes—one-third of the time required by former adjustable machines.

Many manufacturers in the food industry, as well as other fields, use the FA to wrap a wide variety of packages — extension-edge boxes, turned-up-side trays, open boats and ordinary cartons.

The machine may be equipped to use any type of wrapping material. Printed material can be used in roll form and registered accurately by Electric Eye.

Find out how this practical machine will fit in which your packaging requirements. Consult our nearest office.

★

DEFENSE WORK

We, as well as other machine makers, expect heavy demands for defense work . . . You will help your Nation, yourself and us by anticipating your own requirements for machines or service as far in advance as possible.

Write for complete information

PACKAGE MACHINERY COMPANY, Springfield, Massachusetts

NEW YORK CHICAGO CLEVELAND LOS ANGELES TORONTO

Mexico, D. F.: Agencia Comercial Anahuac, Apartado 2303
Buenos Aires, Argentina: David H. Orton, Maipu 231
Peterborough, England: Baker Perkins, Ltd.
Melbourne, Australia: Baker Perkins, Pty., Ltd.

PACKAGE MACHINERY COMPANY

Over a Quarter Billion Packages per day are wrapped on our Machines

SMA's Food Buying Will Go Up Sharply

Increased purchases for relief, British-lend lease buying and stockpile are reasons

SMA's purchase volume over the next year is expected to be stepped up from the recent level of $117,000,000 for relief distribution annually to between $500,000,000 and $750,000,000. Present British plans are to take between $300,000,000 and $500,000,000 in foods under lend-lease. In addition SMA will continue its surplus distribution programs (school lunch relief in kind, 5-cent milk, etc.) and will expand into the field of carrying undeterminable stocks, of commodities purchased to hold prices at predetermined levels. These latter holdings will be for resale in the open market if prices get too high.

SMA's funds are no limitation on its activities. It has recourse to borrowing from Commodity Credit Corp. for purchases in excess of the budgeted limits of its distribution activities.

Suggests Substitutes For Package Materials

SUBSTITUTION of some form of sheet steel protected by paint or plastics, or of paper for bottle caps, including those for milk bottles, is suggested by the advisory

(*Turn to page* 96)

SCHEDULE OF EVENTS

MAY

11—14—Associated Retail Bakers of America, William Penn Hotel, Pittsburgh.
11—17—Carbonated Beverage Week.
14—16—Millers National Federation, Edgewater Beach Hotel, Chicago.
18—20—New England Bakeries Association, New Ocean House, Swampscott, Mass.
19—21—National Cottonseed Products Association, Roosevelt Hotel, New Orleans.
19—23—American Association of Cereal Chemists, Fontenelle Hotel, Omaha.
20—21—New England Association of Ice Cream Manufacturers, Toytown Tavern, Winchendon, Mass.
20—22—Biscuit and Cracker Manufacturers Association and Independent Biscuit Manufacturers' Co., joint convention, Drake Hotel, Chicago.
22—23—Associated Grocery Manufacturers of America, Skytop Lodge, Skytop, Pa.
25—28—Southern Bakers Association, Lookout Mountain Hotel, Chattanooga, Tenn.

JUNE

2— 3—Certified Milk Producers Association of America, Hollenden Hotel, Cleveland.
2— 5—National Confectioners Association of the United States, Palmer House, Chicago.
16—18—Institute of Food Technology, second annual convention, William Penn Hotel, Pittsburgh.
16—18—Flavoring Extract Manufacturers Association of the United States, Hotel Traymore, Atlantic City.
23—24—National Macaroni Manufacturers Association, William Penn Hotel, Pittsburgh.

CAPITAL VIEWS

WAGE CONTRACTS REVOKED—The The courts of certain districts are assuming authority to revoke wage contracts in which employees agree to a basic wage rate less than formerly applicable so that overtime pay calculations may be minimized. One U.S. district court said that so long as the nominal wage rate was above the minimum required by Federal law, this was a permissible practice. But now other Federal courts are saying otherwise. This matter will have to go to the Supreme Court before food plant employers will know whether they can make such arrangements stick with their workers.

BEEF OR "BULL"—After much political maneuvering, Congress finally permitted the Army and Navy to eat some Argentine beef. The whole affair was much more "bull" for political home consumption than any real effort to protect American beef.

FLOUR CLAIMS RESTRICTED — The F&DA has publicly stated its concern over the appearance of "medical claims of the widest scope . . . upon labels of both flours and breads which contain added vitamins and minerals." Compliance with "enriched" flour standards does not legalize any exaggeration or misleading claim. Milling, baking and related industries are urged by their wise leaders to be very careful to curb the enthusiasm of their merchandising and advertising managements. F&DA considers it an obligation "to inaugurate appropriate action" in such cases.

MORE ICC WORKERS—The extension of the Interstate Commerce Commission authority to control of drivers' helpers, loaders, and mechanics is accepted by the Wage-Hour Division of the Department of Labor. However, this Labor agency warns that until ICC actually adopts and enforces the regulations for hours of service that the old 40-hour-week wage-hour regulations still apply. Food plant employees must be carefully guided accordingly.

PRICE FIXING STARTS—Very full authority has been given by the President in price regulation to Commissioner Henderson, who directs OPACS (Office of Price Administration and Civilian Supply). The first broad action limited the price of coal to the schedules prevailing just before production was interrupted by breakdown of wage negotiations. More drastic was the April 17 order freezing the price of steel. Miss Elliott, one of Henderson's principal assistants, frankly says that if food prices get out of hand they too will be fixed. And the fixing will probably be on the basis of past history, almost without regard to new elements of cost. The slightest appearance of unwarranted price rise may bring such crackdown. Conservative pricing is obviously necessary under these circumstances.

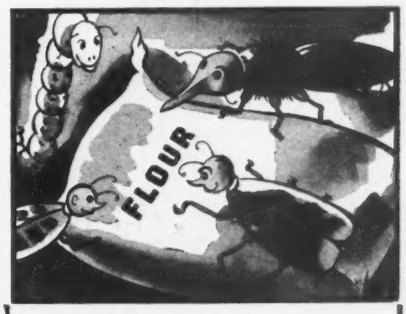
FOUR PRICE RULES—Four rules which will guide OPACS in surveying consumer goods prices to maintain fair levels have been announced by Consumer Commissioner Harriet Elliot. In effect these are: (*a*) Anticipated cost increases must not be used as a basis of increased prices. (*b*) When raw materials advance in price the new purchases must be averaged with inventories on hand for calculating cost. (This practically prevents hedging.) (*c*) Mark-up must not be on the basis of "traditional rates." Unless an actual out-of-pocket cost increase occurs, there is no warrant for increased margins. (*d*) Quoting prices of goods on "price prevailing" encourages upward spirals of prices and will not be regarded as safe by OPACS. Specific prices must be quoted at time of sale if possible.

TRAINING TIME—There has been some dispute as to whether workers attending training classes had to be paid for the time as "hours worked." The Wage-Hour Division now rules "hours spent attending training courses for a higher skill will not be considered hours worked, even though the courses improve the skill of the worker at his present occupation, provided other requirements for such courses are met." Most important of the "other requirements" is that the employee gains a new and different skill which is intended to make him a higher paid wage earner. Mere increase in skill on the present job will not permit omission of the training time from the working period calculation.

WHAT IS HOARDING?—Those who buy big stocks of goods in anticipation of future need will be charged with hoarding if their buying practice makes it significantly more difficult for their competitors to get needed supplies currently. If the competitor is not detrimentally affected, then building of larger stocks of raw materials is permissible, may even be encouraged by the government. But if a big company is found with a big reserve stock and his small competitors cannot get material because the market has been "cornered," then the big boy surely is in trouble. Monopoly charges are likely to result; even commandeering of the stock may occur. Some voluntary arrangements for assisting competitors with supply of raw materials may be necessary where big companies find themselves unintentionally dominating the market because they have wisely been forehanded in purchasing while supplies were abundant.

PRIORITY RULES—Food industries that may wish materials that are being rationed under priorities should study carefully the OPM, rulings, issued April 18, on preference rating classes for users of aluminum. There are defined all the civilian user classifications which will be followed as a pattern in rationing materials which must be allocated according to the relative public urgency of supply. The food industries are directly affected in a number of cases by their placing in the various *B* classifications of the priority list. Comparable classification is to be expected for any other materials on which shortages develop.

CONTROL THOSE PESTS!



FLOUR moths, weevils, worms and other pests are among the costly nuisances and profit-stealers in food processing. Unless controlled they can be the cause for complaints, returned goods and loss of consumer good will.

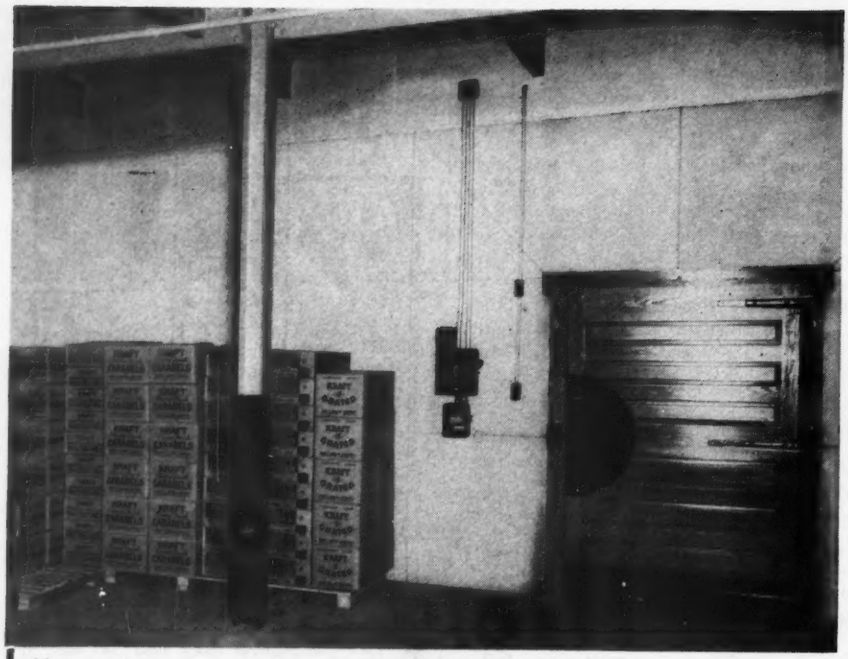
Control pests by thorough fumigation with properly applied HCN gas. Call on your local Pest Control Operator. Talk over your pest problem with him and let him show you his plans for effective control. You will find that a well planned fumigation program carried out by expert and experienced Pest Control Operators may save you future expense and worry that will make it worth many times its original cost.

We have a book containing interesting information about pests and their control by fumigation. Just drop us a line on your letterhead and we will be glad to send you a copy. No obligation, of course.

DU PONT

E. I. DU PONT DE NEMOURS & CO.
INCORPORATED
THE R. & H. CHEMICALS DEPARTMEMT
WILMINGTON • DELAWARE

CYANEGG
AN ECONOMICAL SOURCE
OF HCN FUMIGATING GAS



Above picture was taken at the Kraft plant recently completed at 3105 West Allegheny Avenue, Philadelphia.

Another modern KRAFT Plant . . . insulated throughout with Mundet Cork Insulation

THIS new Kraft plant incorporates the most advanced food processing and storage facilities. Kraft engineers, required precise temperature control to maintain the high quality of Kraft food products . . . specified Corkboard Insulation for all low-temperature rooms. Whether the refrigeration capacity of your plant is large or small, the reasons for insulating with Mundet Cork Insulation are the same:— Reduction of heat flow to the lowest possible minimum; ability of insulation to withstand stress and strain, and to continue in service at maximum efficiency for the longest possible time. Ask us to show proof of what Mundet Cork Insulation can do for you. Mundet Cork Corporation, Insulation Division, 65 S. Eleventh St., Brooklyn, N. Y.

MUNDET CORK INSULATION

CONSERVES LOW-TEMPERATURE

committee of the National Academy of Sciences in a report to OPM.

The report also suggests the use of oiled paper, glassine, tinfoil, leadfoil or transparent cellulose for many of the present uses of aluminum foil.

Emphasis is made in the report that the suggestions for possible substitutions are made only as guides to commercial users having difficulty getting aluminum under the priorities rationing program.

Steps to Save Tin Considered by OPM

Lighter coating on cans likely. Tin reclamation and use of larger cans possibilities

TIN CONTAINER manufacturers have told OPM officials they can cut the amount of tin used in coating cans by 10 percent for about 95 percent of all uses as a conservation measure. This would reduce the basic ratio from 1.5 lb. of tin per base box of plate to 1.35 lb.

Expectation as this is written is that the government will recommend prompt application of the reduction. There is no emergency in tin supplies and none definitely in sight, but shipping facilities are rapidly getting tighter throughout the world and conservation of imported materials vital to our economy is becoming the order of the day.

In conceding the safety of making a 10 percent reduction in tin content for cans, container makers urged against reduction to 1.25 lb., as had been proposed in some government quarters. They also urged that no reduction in present coating be made on baby foods, kraut and high acid fruits such as cherries.

Another program incubating is a national campaign to increase tin-can reclaiming operations. The committee recommended, however, that "unless and until" an emergency makes it imperative to do so necessary additional detinning plants should not be built.

Apparently, greater emphasis is shortly to be placed on the sale of goods in larger sizes of cans. For example, one No. 10 can requires only 53.6 percent as much tin as would the several cans of No. 2 size for packing an equal quantity of fruit or vegetables. The government argues that those who can use big containers do so. The Army and Navy will presumably be correspondingly guided in their future purchases.

Food Stamp Plan Due For Wide Extension

THE FOOD STAMP PLAN is due for wide geographical extension as a result of rearmament-generated increases in

Construction News

	Pending (thousands)	Awarded April (thousands)	Total Awarded 1941 (thousands)
Bakery	$345	$215	$3,180
Beverages	345	580	3,917
Canning and Preserving	150	45	165
Cold Storage Plants	195	.....	382
Confectionery	.....	.....	.....
Grain Mill Products	395	980	2,437
Ice Manufactured	.....	90	180
Meats and Meat Products	65	120	628
Milk Products	335	80	835
Miscellaneous	410	465	1,459
	$2,240	$2,575	$13,183

national purchasing power. The program, under present Surplus Marketing Administration plans, may cover virtually the entire country within a year or so the funds being spread thinly.

OPM Estimates Canned Fruit, Vegetable Needs

7,900,000 cases of vegetables and 2,250,000 of fruits

THE OFFICIAL estimate of government buying of canned fruits and vegetables was published early in April by OPM. The conclusion is that the government will buy for Army, Navy, Marine Corps, Coast Guard and Civilian Conservation Corps about 7,900,000 cases of canned vegetables and 2,250,000 cases of canned fruits. These figures differ somewhat from estimates published in FOOD INDUSTRIES for April, page 67.

V-Day Set for May 27

THE long-awaited "V-Day" will be May 27. On that day it is expected that many millers and bakers who have not already done so will introduce "enriched" flour and bread. V-Day will fall on the second day of a three-day National Nutritional Conference called by President Roosevelt.

Priority List Issued For Users of Aluminum

Food equipment placed in the "B" preference classification

THE FIRST "dictionary" classifying of non-defense aluminum products to the "B" priority ratings has now been issued. The index instructs suppliers of aluminum how to classify purchasers' orders. The listing also enables aluminum users to determine reasonably accurately their chances of getting supplies.

Defense orders, including those for items listed in the index, will continue to carry "A" ratings as applied by the Army and Navy Munitions Board or the Priorities Division. The index also does not cover aluminum supplies for repair and replacement parts for vital equipment. All such requirements take a B2 rating.

Priority Ratings for Food Equipment

	Preference Ratings
Meat Products	
Boilers, ham	B7
Kettles, steam cooking	B7
Presses, ham	B7
All other uses	B8
Dairy Products	
Hoods, cottage cheese jars	B3
All other uses	B8
Canned and Preserved Foods	
Kettles, steam cooking	B7
Plates, quick freezing	B3
Tubing, conveyor line, for wine and pineapple juice	B7
All other uses	B8
Grain-mill Products	
All uses	B8
Bakery Products	
Kettles, steam cooking	B7
All other uses	B8
Sugar	
All applications	B8
Confectionery and Related Products	
All uses	B8
Beverages	
Spots, crown	B7
All other uses	B8
Miscellaneous Food Preparations and Kindred Products	
All uses	B8

Big Wheat Crop Expected

ACCORDING to the March report of the Crop Reporting Board, the United States can look for another large crop of wheat this year. As a consequence, wheat supplies of the country for the 1941-1942 crop year will likely be at a high point.

Expectations for winter wheat this year were given by the Board at 616,300,000 bu., which compares to a crop of 589,151,000 bu. harvested last year and to a 1930-1939 average of 569,417,000 bu.

Spring wheat was, of course, not estimated by the Crop Reporting Board, but prospective plantings and a normal yield would give a crop of about 180,000,000 bu. In addition, it is expected that the carry-over on July 1 from the 1940-1941 season will amount to about 380,000,000 bu. Combining these figures, it is apparent that the total available wheat supply for the 1941-1942 year should be around 1,200,000,000 bu. With normal domestic consumption of less than 700,000,000 bu. the carryover on July 1, 1942, is likely to exceed 500,000,000 bu.

Oil Prices Go Higher

EDIBLE vegetable oils and fats, as well as lard, upped in price 10 percent and more during the month from mid-March to mid-April. Reasons for this advance are largely psychological, resting upon anticipations of increased costs and high-

SEAMLESS STEEL CONTAINERS

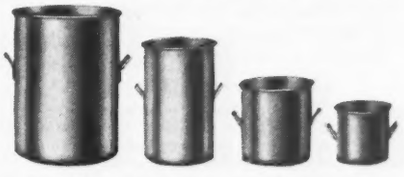
FOR EASIER, SAFER, MORE ECONOMICAL STORING and HANDLING

Hackney Seamless Steel Containers cannot be excelled for inter-departmental handling of raw products during manufacturing processes—or where sanitary, strong and durable containers are required for storage of materials. They're used to great advantage for holding foodstuffs, liquids, chemicals, ice, etc., as well as for food scraps.

OUTLAST ORDINARY CONTAINERS

Hackney Seamless Containers are highly durable—easy to clean. They're cold-drawn to shape—not a weld or a joint in their entire construction. The bottom is reinforced with a wearing ring. Ordinary containers can't begin to compare with them from the standpoint of long life, appearance or cleanability.

IN ALL POPULAR SIZES



Hackney Seamless Steel Containers are furnished in all popular sizes—5 gal. to 60 gal. capacity. Several types of finishes are available—galvanized, tinned, or black. Write today for complete details—they're designed to fit your requirements.

Hackney MILWAUKEE

PRESSED STEEL TANK COMPANY

1349 Vanderbilt Concourse Bldg., New York
208 So. LaSalle St., Room 1573, Chicago
669 Roosevelt Bldg., Los Angeles
1457 So. 66th St., Milwaukee

Containers for Gases, Liquids and Solids

Rushed
FROM OFFICE
TO WAREHOUSE...
or to any desk in
office or plant

Mail
Telegrams
Laboratory Samples
Shipping Orders
Stock Requisitions

by LAMSON TUBES

● Now rush those shipping orders from office to warehouse . . . and give every other department in your office or plant the benefit of instant receipt and delivery of memos, orders, letters, telegrams, stock requisitions, time tickets or laboratory samples. Lamson Dispatch Tubes rush these items from desk to desk, from building to building—upstairs or across the street—in the twinkling of an eye.

Work moves in a steady flow. No peak hours, no careless, last-minute rushes to complete work before closing time. No delay in urgent matters while papers pile up waiting for messengers. No workers absent from their stations, wasting precious minutes in needless walking.

LOW IN COST

The cost of tubes is surprisingly low. You can install one tube or many—from a few feet up to a mile or more. And no business is too small or too large to employ them. Recent users range from a Quaker Oats plant in Ontario to a Swift & Co. plant in Vernon, Calif.

Learn the latest advances in Tube design and engineering . . . the new ways in which they will save you time, labor, money. Mail the coupon today.

LAMSON Dispatch TUBES

LAMSON CORPORATION,
505 Lamson Street,
Syracuse, N. Y.

Without cost or obligation, please send me by return mail information regarding the use of Lamson Tubes in my business.

Name.....*Title*.....
Company.....
P.O......*State*.....

er demand, rather than upon any existing shortages. Because some of the oils used in paints and varnishes and in soap are actually restricted in supply, for example tung, perilla and palm oils, hopeful or fearful buyers of food oils expect the same thing to happen in the food field.

However, the government in Washington has a definite interest in seeing that food oils and fats do not go too high in price, particularly since the passage of lease-lend legislation. So, with the principal food fats and oils, including lard, cottonseed oil, peanut oil, soybean ol and corn oil, already in ample supply, steps are being considered to insure a considerably greater 1941 output of at least some of these materials. Consequently, it is not at all likely that any runaway price situation will develop among the edible fats and oils during the next few months.

Sugar Production Still Above Sugar Comsumption

PRODUCTION of sugar throughout the world in the current crop year ending August 31, 1941, is forecast by Lamborn & Co., of New York City, at 30,237,000 long tons, raw sugar value. Production in the preceding crop year was 30,974,000 tons, so that the predicted decrease is 757,000 tons or 2.4 percent. However, production last year was the largest on record and exceeded the crop of two years ago by 1,496,000 tons.

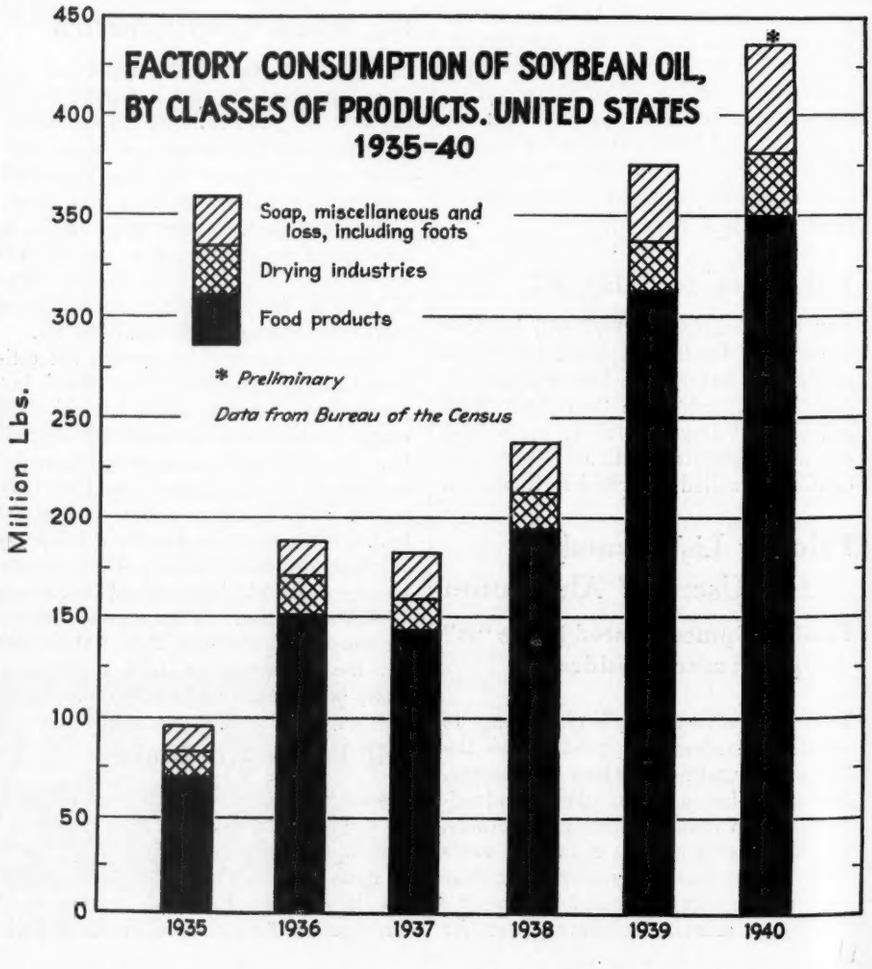
Consumption of sugar for the crop year ending August 31, 1941, is estimated by the same company at 29,295,000 tons, down 1.8 percent from the consumption of 29,819,000 tons in the preceding year. This consumption would be the smallest recorded since the 1935-1936 crop year, when the total was 29,231,000 tons.

Meanwhile, world stocks of sugar on hand at the ending of the current crop year are expected to exceed 11,000,000 tons.

It is evident that the slight decrease in production that is expected will produce no shortage and that any disturbance in sugar deliveries for consumption that may occur will be due to some other cause, such as lack of shipping, and not to the supply situation.

Commodity Prices Trend Up for Another Month

SINCE commodity prices, after the New Year, really started to rise from the dead levels maintained throughout much of 1940, the upward movement has con-



tinued. Again, in the month from mid-March to mid-April, an advance was registered. The *New York Journal of Commerce's* weekly index of commodity prices, at 84.1 on March 15, 1941, registered 85.9 on April 12. Between these same dates this publication's index of grain prices rose from 67.8 to 71.4, while the index for food commodity prices rose from 71.3 to 74.4. However, the *Business Week* index of business activity fell from 144.8 to 137.9 in the same period, largely because of the stoppage of coal mines and some industries by labor difficulties. In the four weeks between March 8 and April 5, 1941, the U. S. Department of Labor's index of wholesale prices rose from 80.6 to 82.2; its index of farm product prices rose from 70.5 to 72.7 and its index of food prices rose from 73.4 to 76.7.

While spot commodity prices showed their usual varied picture for the month, the trend was generally up. Wheat, No. 2, dark winter, at 85¼c. on March 19, was 87¼c. on April 16. Flour was steady for the same month, at $5.25. Corn, No. 3 yellow, rose from 63¾c. to 68¾c. Beef and lamb were steady at 17c. but pork loins fell from 18c to 17c. Eggs upped from 20c. to 22c., butter from 31½c. to 32c. and cheese rose from 16¾c. to 18¼c. Sugar was steady during the month, coffee increased from 9c. to 9¾c. while cocoa fell from $7.60 to $7.32. Canned foods were steady, except salmon, which increased from $2.65 to $2.75.

INDICATORS

CONFECTIONERY and competitive chocolate products sales in February, 1941, based on returns from 210 manufacturers are reported by the U. S. Department of Commerce at $23,305,000, up 11 percent over sales in February, 1940, and 7 percent over sales in January, 1941.

FLOUR PRODUCTION in March, 1941, was reported by *The Northwestern Miller* for mills producing 65 percent of U.S. output at 5,775,885 bbl., compared to 5,610,102 bbl. in March, 1940.

SUGAR ENTRIES against quotas from offshore countries, during the first three months of 1941, are reported by the U. S. Department of Agriculture at 1,399,958 tons, compared to 984,220 tons in the like months a year before.

SNAP BEAN ACREAGE for canning and canning and freezing in 1941 are expectcultural Marketing Service to be 74,530 acres, compared to 65,930 acres last year and to a 1930-1939 average of 57,110 acres.

SWEET CORN PLANTINGS intended for canning and freezing in 1941 are expected by Agricultural Marketing Service to be 400,600 acres, 22 percent more than the 327,170 acres planted in 1940 and comparing to an average of 341,620 acres in 1930-1939.

TUNA CANNED in California in 1940 totaled 4,162,000 standard cases, a new high record, and comparing to 3,400,000 cases packed in 1940, the previous record year.

CANNED MILK EXPORTS in January-February, 1941, at a total of 19,211,750 lb., compare to 5,816,863 lb. for a like period of 1940.

IMPORTS of canned foods into the United States are running about one-third below imports of a year ago.

BEET SUGAR PRODUCTION for the 1940-1941 season was 1,887,903 short tons, raw value, a new high record, comparing to 1,764,304 tons in the preceding season.

CHICKENS raised on farms in 1941 are expected to exceed 1940 numbers by about 10 percent, according to the Bureau of Agricultural Economics.

EGG PRODUCTION in 1941 is expected to remain at 1940 levels.

BUTTER, creamery, produced in February, 1941, is reported by Agricultural Marketing Service at 130,825,000 lb., compared to 127,775,000 lb. in February, 1940, and to a February average of 111,840,000 lb. for the years 1930-1939.

CHEESE, American, produced in February, 1941, is reported by Agricultural Marketing Service at 35,695,000 lb., compared to 33,055,000 lb. a year before and to an average of 25,103,000 lb. for the month in 1930-1939.

OLEOMARGARINE sales in February, 1941, as indicated by sales of internal revenue stamps, totaled 30,154,750 lb., compared to 29,742,014 lb. in the corresponding 1940 month.

MILK SALES in February, 1941, are reported by the Milk Industry Foundation at 3.08 percent above February 1940.

MILK PRODUCTION per cow on March 1 of this year was 1 percent above the production a year ago and total milk output, because of increased cow numbers, was 3 percent higher.

DAIRY PRODUCTS production in 1940 was the highest on record, according to the Bureau of Agricultural Economics.

POTATO ACREAGE indicated for 1941 is 4 percent smaller than in 1940, and the estimated output of potatoes is 340,000,000 bu., 15 percent below the 1940 crop, according to the U. S. Department of Agriculture.

SWEET POTATO ACREAGE for 1941 is expected to exceed 1940 acreage by 8 percent.

DRY, EDIBLE BEAN ACREAGE in 1941 is forecast at 8 percent below the acreage planted last year.

FRUITS, FROZEN, in storage on April 1, 1941, totaled 99,036,000 lb., compared to 89,699,000 lb. a year before and to an average of 78,960,000 lb. for the date in 1936-1940.

VEGETABLES, frozen, in storage on April 1, 1941, totaled 55,465,000 lb., compared to 53,897,000 lb. on April 1, 1940.

BUTTER, creamery, in storage on April 1 of this year was 8,987,000 lb., compared to 8,875,000 lb. a year before and to an average of 22,955,000 lb. for April 1 in the years 1936-1940.

CHEESE, all kinds, in storage on April 1, 1941, amounted to 109,827,000 lb. A year previous the quantity was 75,410,000 lb. and the April 1 average in 1936-1940 was 78,654,000 lb.

EGGS, case equivalent, in storage on April 1, 1941, totaled 2,903,000 cases, compared to 2,117,000 cases on April 1, 1940, and to an average of 2,811,000 cases for the date in 1936-1940.

POULTRY, all kinds, in frozen storage on April 1 this year totaled 126,885,000 lb. On April 1, 1940 the quantity was 115,442,000 lb. and the average for April 1 in 1936-1940 was 95,013,000 lb.

MEAT, all kinds, in cure and storage on April 1, 1941, was 962,277,000 lb., compared to 830,731,000 lb. a year before and to 749,640,000 lb. as an average for April 1 in 1936-1940.

LARD IN STORAGE April 1 this year totaled 310,725,000 lb. and rendered pork fat in storage on the same date totaled 9,691,000 lb. The two products combined a year before totaled 268,777,000 lb. and the average total for these products on April 1 in 1936-1940 was 162,677,000 lb.

WEEKLY WHOLESALE FOOD PRICE INDEX of Dun and Bradstreet stood at $2.75 on April 9, 1941, the highest level since November 9, 1937 and comparing to $2.30 for the corresponding week of 1940.

COST OF LIVING INDEX of National Industrial Conference Board at the end of March, 1941, was 86.3, compared to 86.1 a month before, with the cost of food index rising from 78.8 to 79.2 for the same month.

K&M PIPE INSULATION PROTECTS FINE WOOLENS AGAINST SPOILAGE IN LEADING TEXTILE PLANT

Washing department in large Eastern textile plant, showing the cold water lines running above the washers. These lines are insulated against corrosion and condensation alike with Keasbey & Mattison materials. Material was applied by Mundet Cork Corp., approved K&M Distributor in Brooklyn, N.Y.

In addition to its normal duty of saving heat and fuel, K&M insulation often performs unusual money-saving functions. An important instance of this sort occurred in a large Eastern textile plant where fine woolens are manufactured.

Cold water lines run above the textile washers in a fume-filled room where the temperature is 85° and the humidity stays high. It is easy to see what would happen if some sure way were not found to protect the cold water lines against corrosion and condensation. Rusty water would drip on fine woolen piece goods. Stained textiles are spoiled textiles. This danger had to be absolutely eliminated.

Keasbey & Mattison engineering devised the method, and Keasbey & Mattison insulation materials supplied the means of protecting the cold water lines against fumes, heat, and moisture alike. The result is a pipe line that neither corrodes nor drips, and textiles that are safe against rust stains.

The line of Keasbey & Mattison asbestos and magnesia insulation products is complete, and is specialized for the needs of each plant. K&M engineers, working with K&M Distributors strategically located throughout the country, can point the way to real savings in your plant, too. Write Dept. 11 for full details.

KEASBEY & MATTISON
COMPANY, AMBLER, PENNSYLVANIA

Men, Jobs & Companies

INDUSTRY

Adolphus Rice Mill Co., Houston, Tex., is expanding its plant with an addition costing $50,000.

Amalgamated Sugar Co. will build a $200,000 sugar beet drying plant in New Plymouth, Idaho

Blue Bird Pie Co. plans to construct a $150,000 modern pie bakery at Hartwell, Ohio.

Cudahy Packing Co. has begun operation of its new $350,000 plant in Omaha. The plant, used for sausage making and meat canning operations transferred from Kansas City, is supervised by C. A. Stewart.

Forest Hill Dairy, Memphis, Tenn., is introducing to that area the manufacture of powdered and condensed milk from fresh Grade A milk. A fully equipped plant costing $35,000 will begin operations by May 15.

G. L. F. Mills, Inc., will begin construction of a new grain elevator and storage tanks adjoining its Buffalo feed mill, in a current expansion program of $2,000,000.

Glaser's Provisions, Omaha, Neb., will award a contract for construction of a $75,000 packing house and distributing plant in St. Joseph, Mo.

CARL N. LOVEGREN

Canners League of California has elected Carl N. Lovegren, Hunt Brothers Packing Co., president. Preston McKinney is executive vice president.

L. A. VAN BOMEL

National Dairy Products Corp. has announced promotion of Mr. McInnerney, founder and president, to the new post of chairman of the board. L. A. Van Bomel, executive vice president, has been elected president. He has been president of Sheffield Farms Co., a subsidiary of National Dairy Products Corp., since 1927.

T. H. McINNERNEY

Gooch Milling & Elevator Co., Lincoln, Neb., has started construction of a $100,000 new grain storage elevator, with 1,000,000 bu. capacity.

H. C. Hemingway & Co.'s Clyde, N. Y., cannery recently suffered damage of $75,000 in a fire at its plant there.

Henningsen Bros., New York egg processors, has opened an egg drying plant at Lamesa, Tex.

Kessler-Bagnetto Canning Co. is building a $50,000 citrus fruit and vegetable cannery at Donna, Tex.

Kraft Cheese Co. plans to construct a $50,000 processing and distributing plant in Elmira, N. Y.

Kroger Grocery & Baking Co., Cincinnati, has announced an expansion program which will include construction of a $60,000 addition to its meat packing plant in Columbus, Ohio.

Loose-Wiles Biscuit Co. will begin operation, within a few months, of its new $2,000,000 plant at Oakland, Calif.

Meier's Wine Cellars, Inc., Silverton, Ohio, has purchased Sandusky Wineries, a 300,000-gal. plant at Sandusky, Ohio.

National Biscuit Co. plans to erect a large baking plant, at a cost of $5,000,000 to $8,000,000, on a 50 acre tract in Chicago. The armament program may delay immediate start on construction work.

Salerno-Megowen Biscuit Co., Chicago, is building a $250,000 plant addition 100x200 sq.ft., increasing the company's production capacity by 25 percent.

Standard Brands, Inc., has approved the company's employee retirement plan inaugurated Jan. 1, with 97 percent of stockholdlers' votes supporting the measure.

Sterilized Coffee Products, Inc., Toledo, has been formed to make a coffee concentrate in a plant completely sterilized by ultra-violet lamps. George P. Dietrich is president.

W. L. HEALD

W. L. Heald, formerly chief chemist, National Biscuit Co., plant laboratory, Toledo, has become assistant director of W. E. Long Laboratories, Chicago. Valentine Shiple succeeds him as head of the National Biscuit laboratory.

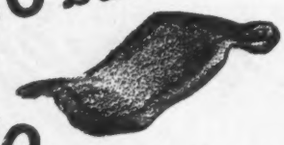
DR. W. H. CATHCART

Formerly director of research, American Institute of Baking, he is now head of the laboratories of the national bakery division of A. & P., New York, succeeding Ray T. Bohn, now chief chemist for General Baking Co., New York.

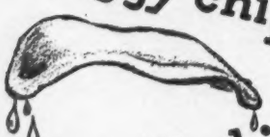
J. S. ROSS

Grocery Store Products Co., Inc., New York, has elected as vice president J. S. Ross, general sales manager. Mr. Ross will assume the duties of sales manager of National Macaroni Co., and will have headquarters in Chicago.

NO burnt chips



NO soggy chips



NO rancid chips

Those are the profit-stealers, the good-will wreckers of old fashioned methods. Get rid of them for good by installing a

FERRY

CONTINUOUS POTATO-CHIP MACHINE

It's the modern, sanitary, *profitable* way to do business . . . From raw unpeeled potatoes to perfect finished chips every operation except inspection of the slices is completely automatic and continuous . . . Peeling, slicing, drying, frying, cooling and salting are all under "push-button control" . . . Hour after hour, day after day the product of a Ferry Machine never varies from top quality—And, better yet, production costs are far lower than with other methods of manufacture . . . Made in 5 sizes to suit your needs, with capacities from 50 to 350 lbs. of chips per hour. Write us today for illustrated bulletin.

ALSO MAKERS OF:

SLICERS & AUTOMATIC SLICER FEEDERS

CAN WASHING MACHINERY

J. D. FERRY CO.

129 SO. CAMERON ST.

HARRISBURG, PA.

PERSONNEL

B. F. Beach has been named secretary-manager of Michigan Producers Dairy Co., Adrian, Mich., replacing the late O. T. Goodwin.

Walter A. Benz, vice president of Strohmeyer and Arpe, has been elected president of the Olive Oil Association of America.

J. Scott Brown, formerly with Loose-Wiles Biscuit Co., has been appointed vice president of Gordon Foods Inc., Atlanta, Ga.

George H. Crofton, formerly general manager of Krueger Beverage Co., has taken office as vice president of Vanti-Pa-Pi-A Corp. with headquarters in New York.

Albert L. Eviston has been named manager of Swift & Co.'s Los Angeles plant, succeeding the late J. A. White.

Benjamin Free, program organizer for U. S. Department of Agriculture's food stamp plan, has taken leave of absence from SMA to serve as executive secretary of the Surplus Foods Committee of Greater New York.

Neal D. Kelley has been appointed assistant to the president of National Dairy Council, replacing A. N. Benson, who has resigned.

S. H. Ludwig, Philadelphia, has been retained by Fairmont Creamery Co., Omaha Neb., to take charge of the frozen egg department which was recently greatly enlarged.

Reuben B. Meckel, for eight years in the production department of Zinmaster Baking Co., Minneapolis, has joined the research staff of American Institute of Baking and become an instructor in the School of Baking. Another recent addition to the American Institute of Baking staff is David E. Downs, formerly with Purity Bakeries Corp.

Perrin Miller, of Albert Miller & Co., has been appointed assistant to John A. Martin, chief of the perishable foods section of the Army's procurement division.

Theodore G. Montague, president of Borden Co., has been elected a director of American Sugar Refining Co.

Daniel Peterkin, Jr., has become president of the Morton Salt Co., Chicago, succeeding his father, the late Daniel Peterkin, Sr. Chairman of the board is B. W. Carrington.

Arthur W. Quiggle, former general manager of Creamette Co., will be the new manager of H. H. King Flour Mills Co., Minneapolis, Minn., succeeding James M. Quilty, who is retiring July 1 because of ill health.

Jacob Reed has been elected president and chairman of the board of Hathaway Bakeries, Inc., Cambridge, Mass.

Fuller **STEELGRIPT BRUSHES**

TO manufacturers and processors of Food: Wherever you use Brushes, consider Fuller STEELGRIPT'S enduring construction with its greater density of brush material, securely gripped in rigid, rust resisting metal backings.

Conveying equipment, wrapping and packaging, bottling and labeling machinery operate more efficiently with these sturdy, long wearing Brushes.

Also try our standard line of Floor Brushes, Dusters and the famous FULLER FIBER Broom.

The FULLER BRUSH Company
INDUSTRIAL DIVISION — DEPT. IC
3592 MAIN STREET - HARTFORD, CONN.

LUSTRACAST by COOPER

(Electrolytic Polish)

Stainless Steel CASTINGS Fittings • Valves

Improve the quality of your stainless products with COOPER "Lustracast" Stainless Steel Castings, Fittings, Valves.

The exclusive "Lustracast" process gives COOPER products a brighter, CLEANER, more passive surface which in turn increases the practical utility, life and saleability of your products.

Investigate these definitely BETTER Stainless Castings, Fittings, Valves.

The COOPER Alloy Foundry Co.

Elizabeth, N. J.

W. J. Shortreed, a director of H. J. Heinz Co., has been made vice president of the company.

Joseph A. Stary, Jr., head of the Marquette Dairy Co., Chicago, was elected president of the Associated Milk Dealers.

A. K. Tichenor has been elected president of the Alaska Packers Association, succeeding William Timson, now chairman of the board.

Walter Wegner, severing his connection with Wegner Canning Corp., Sodus, N. Y., has organized the Wegner Food Corp. The new corporation is building a plant at Williamson, N. Y., to produce tomato juice, beets, carrots and apple sauce, and to freeze cherries.

Harold Young has been named manager of Beck Dairy Co., Middletown, Ohio, acquired by Borden Co. last month.

DEATHS

Birton E. Babcock, 70, president of Empire State Pickling Co., large sauerkraut manufacturing concern, April 7, in Phelps, N. Y.

A. Birney Brown, 70, vice-president of Brown Brothers Packing Co. until it was dissolved, recently, in Indianapolis.

Charles A. Clark, 72, director of procurement of raw materials for all Beatrice Creamery plants, March 31, in Chicago.

William Henry Gardner, 76, owner of the Gardner milling and extract plants, March 26, in Waynesboro, Va.

Robert Sherman Lazenby, 74, originator of the formula for the carbonated beverage Dr. Pepper, and president of the Dr. Pepper Co., April 17 in Dallas, Tex.

Henry H. McVey, 78, manager of the Richmond, Va., plant of Kingan & Co., April 4 in Richmond.

C. Redman Moon, secretary-director of Goebel Brewing Co., March 23 in Detroit.

James H. Nield, 48, Racine, Wis., branch manager for Armour & Co., March 10 in Racine.

Clements Philipski, 61, founder and president of the Rosebud Creamery, Detroit, March 27 in Detroit.

Albertis Edward Wright, 73, pioneer manufacturer of mayonnaise, March 29 in Los Angeles.

ASSOCIATED INDUSTRIES

American Can Co. has announced resignation of Henry W. Phelps as chairman of the board of directors. Mr. Phelps will continue to serve the company in an advisory capacity.

E. I. du Pont de Nemours & Co. has begun research at Wilmington, Del., on molds and bacteria forms which cause spoilage loss.

Foxboro Co. is erecting a building in Pittsburgh to bring together servicing departments and offices in that territory.

Knox Glass Associates, Inc., is constructing a $380,000 manufacturing division at North Lincoln, Ill., to produce glass food containers. A second unit to be built in 1942 will be used for production of beverage bottles.

Rumford (R. I.) Chemical Works recently completed the first part of its new Rumford Research Laboratory, covering 5,000 sq. ft. of a 12,000 sq. ft. building. The laboratory will ultimately house all the existing research facilities and specific items of pilot plant equipment.

Universal Colloids, Inc., is completing construction of a $500,000 plant in McAllen, Texas, for the manufacture of metallic pectinate, a citrus byproduct. The plant will use grapefruit peel, hitherto largely a waste product.

NEW STRAIGHT-LINE PLANT ON WEST COAST

Nelson Packing Co. of San Francisco has moved its offices and cannery to a new building with 30,000 sq.ft. of floor space, all on one level to provide straight-line operations. President and manager of the company is Olaf A. Nelson, who has had a quarter of a century of experience in the food industry.

With VIKING 3's NOT a CROWD

With every Viking installation you save valuable plant floor space. That's because all Viking Rotary Pumps are simple in principle (only 2 moving parts) . . . a compact design makes it possible to neatly fit more Viking Rotary Pumps into less space without crowding. There are no space-wasting features, no springs or tricky gadgets . . . every pump is ALL pump. With plant floor space at a premium today, this is a mighty important factor. For greater pumping economy, for neater, space-saving installations, equip your plant with Viking.

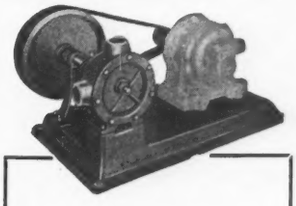


FIGURE 53

V-belt motor driven unit.

Furnished in iron, bronze-fitted or all bronze construction.

Available in capacities from 5 to 1050 GPM.

Belt guard is furnished as standard equipment.

VIKING PUMP COMPANY
CEDAR FALLS, IOWA

Food Equipment News

Pipe Coupling

REGOR PRODUCTS CO., 333 Kearney St., San Francisco, Calif., is making the Regor All-Service coupling for pipelines of all types. These couplings are used with plain pipe and consist of malleable iron body castings and interior sleeve, black steel bolts and rubber gaskets. The only parts of the coupling that come in contact with the liquid being carried in the pipeline are the sleeves. These sleeves are lined or treated in various ways to resist the action of the fluid being carried in the pipe and to prevent contamination of these fluids. The manufacturer states that these couplings are available for use with almost any kind of pipe and, with the proper sleeve, for the transfer of any kind of food liquid. They come for pipe sizes from ¾ in. to 4 in. nominal diameter.

Coupling for food plant pipelines.

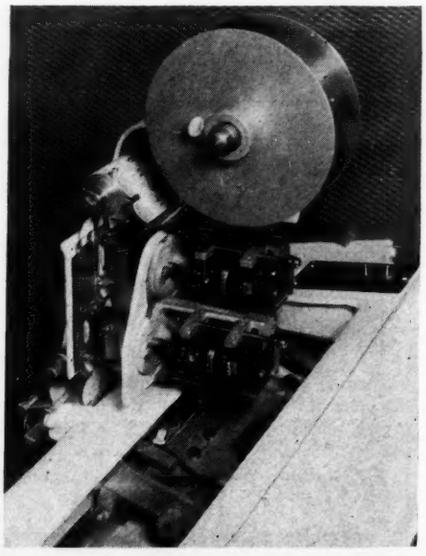
Automatic Labeler and Coder

OLIVER MACHINERY CO., Grand Rapids, Mich., has developed an automatic labeler and an automatic coder for use in automatic wrapping operations. These attachments heat-seal a label on a wrapper and code it or double-code it.

The labeler is of the roll type and uses die cut, heat-sealing labels in rolls. These labels can vary in size and shape and may be printed in 1, 2 or 3 colors on different types of paper, including gold or silver paper. A roll usually consists of 2,500 labels. The labels are fed automatically and are cut from the rolls and heat-sealed in any desired spot on the wrapper as the wrapper comes off the wrapper roll and before the wrap is made. The exact location of the label on the wrap is assured by the labeler control.

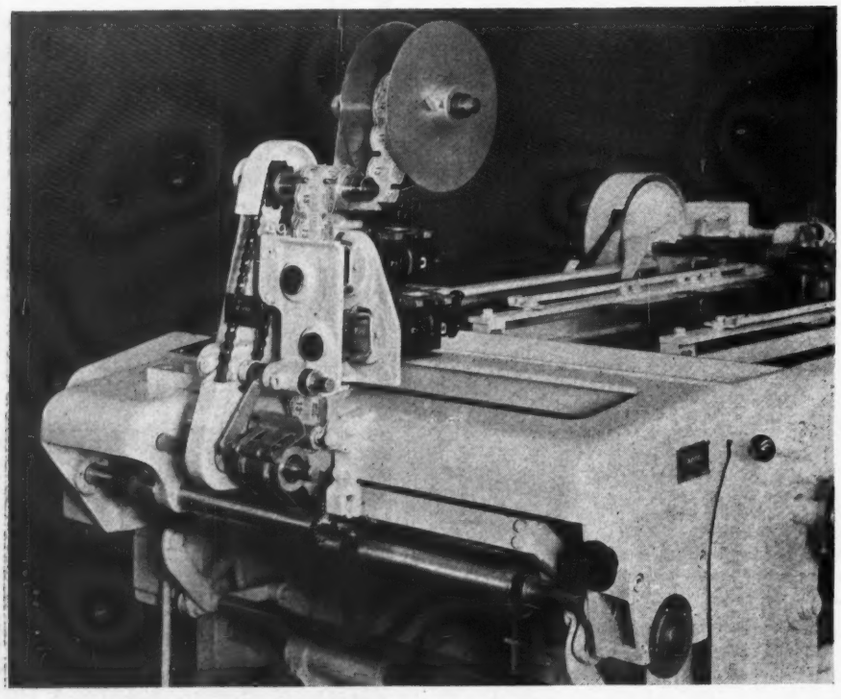
The label coder consists of a carrier which fastens onto the labeler and will carry either one or two coders. The roll-type coder is an electrically operated printing device using a solenoid which actuates the stamping of a code in numbers or letters on the face of the label before the label is cut off and applied to the wrapper. For each label fed, or for each sheet of wrapper cut, an impression is automatically made. Double coding is possible with this device.

Imprinting units are easily attachable to the carrier. The code printing may be in any standard color such as red, purple, black, green or so on. The printing device is self-inking, making an impression equivalent to that of a typewriter. The device is arranged to place each code imprint in a uniform position on succeeding labels.



Coding device for use in connection with automatic labeler.

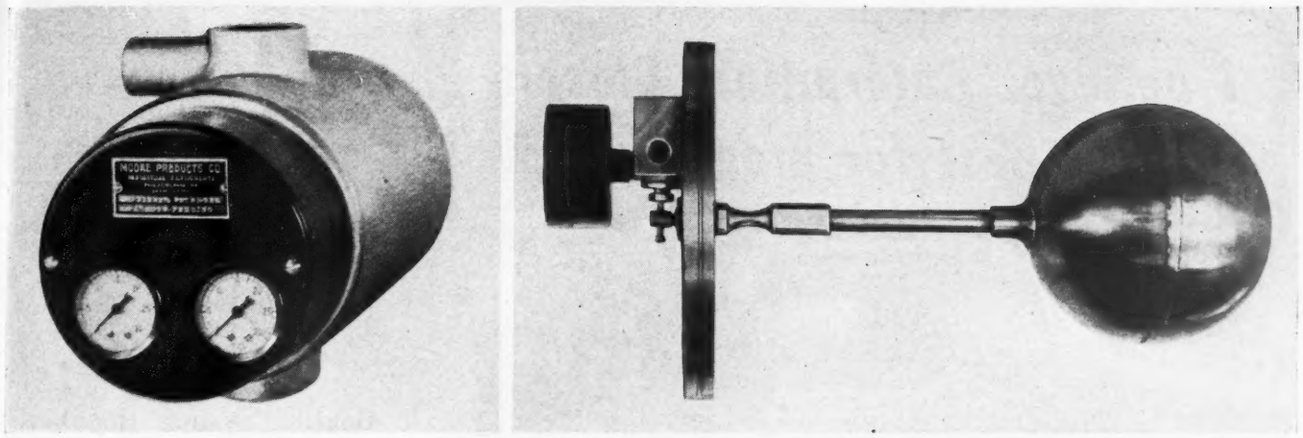
These two new devices are offered by the maker not only for use on Oliver automatic wrapping machines, but also for other makes of wrapping equipment.



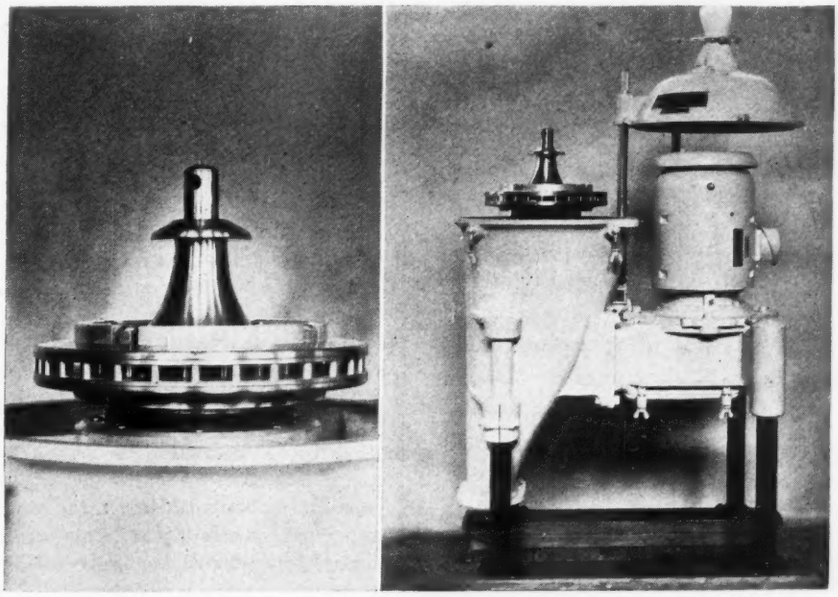
Automatic labeler for use on wrapping machinery.

New Model Insect Killer

TO WIDEN the application of its mechanical Entoleter, a machine for killing in-



Liquid level controller which needs no packing gland, pressure type shaft or electrical transmitting system.



The new model Entoleter for destroying insect life in bulk products, with close-up of new rotor.

sects in flour and free-flowing materials, Entoleter Co., Inc., Div. of Safety Car Heating and Lighting Co., Inc., 230 Park Ave., New York, has brought out a machine with a new type of rotor. As described in Food Industries, April, 1940, page 88, the rotor of the former model consisted of a number of circular disks, with a small, fixed clearance between each two disks. The flour, fed in at the center of the rotor, was thrown out to the circumference of these disks by centrifugal force. As the product passed through the small spaces between the disks, it was slowed up, causing impact between the particles and destroying all insect life.

In order to accommodate a number of products, many of coarser grain than wheat flour, the new rotor has been designed. It is made up of two disks, spaced $\frac{5}{8}$ in. apart and separated by two concentric rows of cylindrical spacers, as shown in the accompanying photograph. In this type of rotor, the material is violently thrown against the spacers, the impact being effective in killing any insect life.

In addition to its application to wheat flour, this new machine has proved to be effective in eliminating insect infestation in a variety of products, including dog food, pancake flour, and ready mixed and compound products of fine and coarse ground consistency.

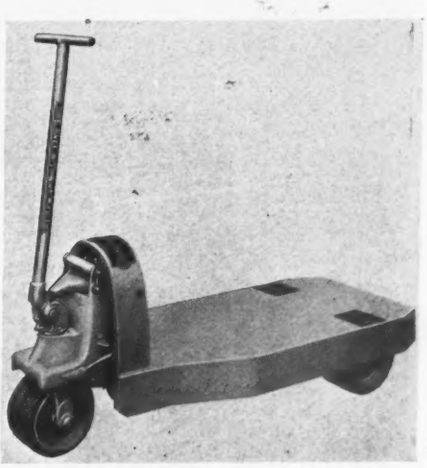
Liquid Level Controller

MOORE PRODUCTS CO., 3629 N. Lawrence St., Philadelphia, Pa., has brought out a liquid level controller which is said to eliminate the need for packing glands, pressure type shafts or any electrical system for transmitting motion through the wall of a pressure vessel to the atmosphere. The controller consists of a 4-in. diameter float and shaft, connected with a flattened member, similar to a Bourdon tube, which is fastened to a supporting flange. A flat lever inside of this tube and fastened to the float shaft end, connects with the air pilot or microswitch for controlling the liquid level. A change in position of the float, as the liquid level changes, flexes the flattened tube and through the flat lever transmits the float motion to atmospheric pressure.

A sensitivity is claimed for this controller that results in a change of 15 lb. on the transmitted control pressure for each change in level of $\frac{1}{2}$ in. By special construction, this controller has been used successfully, according to the manufacturer, for interface level control where the difference in specific gravity of the two liquids is as low as 0.07. The device comes in materials to suit the action of the liquid being controlled, so that it may resist corrosion or contamination of the liquid.

Lift Truck

A HAND LIFT TRUCK operating by the hydraulic method has been brought out by Yale & Towne Mfg. Co., Philadelphia,



Hand-operated lift truck using a hydraulic lifting mechanism.

I believe "Caterpillar" Diesels are the best for producing ice

MR. J. T. FRANKLIN, of West Helena, Ark., had a lot of things in mind when he came out so strongly for "Caterpillar" Diesel Engines. He was thinking about the service he gets from his "Caterpillar" Diesel . . . its operating economy . . . and its ease of operation. He says his engine kicks on almost as easy as an electric motor!

And Mr. Franklin was thinking how little fuel his "Caterpillar" Diesel D4400 Engine uses — only 1½ to 2 gallons an hour, at 4½c a gallon to produce 7½ tons of ice in a 24-hour day!

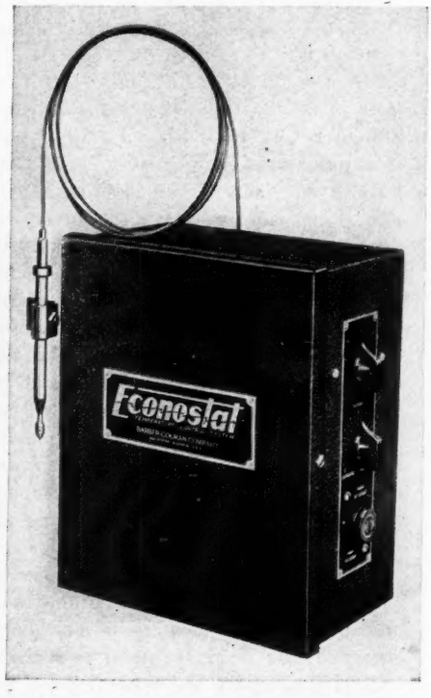
When you've got a "Caterpillar" Diesel, you've got a *cost-cutter* and *profit-booster!* Fuel, for instance, is not only used in small amounts — but it's low-priced, low-grade, non-premium Diesel fuel. You've got low maintenance-cost, too . . . through "Caterpillar" quality manufacture which includes "Hi-Electro" hardening for parts that have to fight the most wear: such as cylinder-liners and crankshaft. Many of these engines have run more than 20,000 hours, and are still giving low-cost, *money-saving* service! SEND FOR FREE LITERATURE.

CATERPILLAR DIESEL
REG. U.S. PAT. OFF.
ENGINES AND ELECTRIC SETS
CATERPILLAR TRACTOR CO., Dept. FI-5, Peoria, Illinois
Please send free information on "Caterpillar" Diesel Power. We require about _____ hp., or _____ kws.
Name _____
Street _____
City _____ State _____

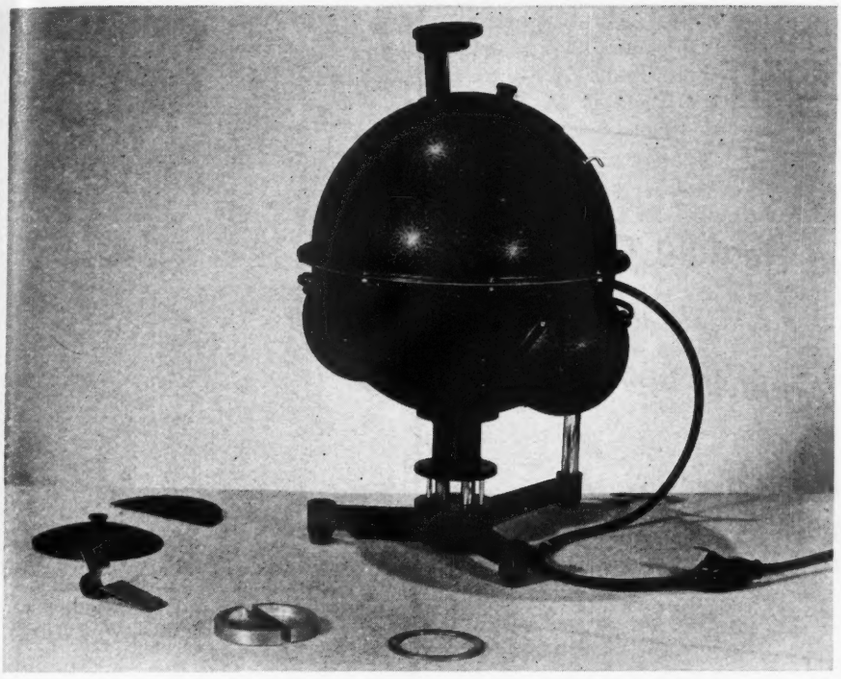
Pa., under the name of "Load King". This truck is built for capacities of 3,500, 5,000, 6,000 and 8,000 lb. in continuous heavy duty service. The hydraulic mechanism used for lifting loaded skids and platforms operates by means of hydraulic pressure maintained from a 5-pt. oil reservoir said to contain sufficient oil to last through five years of operation. The hydraulic pump unit is protected by a built-in guard to avoid outside shock or damage. The truck is equipped with ball and roller bearings for easy operation.

Heating System Regulator

BARBER-COLMAN CO., Rockford, Ill., has brought out the "Remote Bulb Econostat" an instrument for regulating heating systems in factories and other buildings. It is intended for use in installations that cannot be satisfactorily controlled from a single thermostat. This device operates by regulating the heat inside the building in accordance with variations in the outdoor temperature. In this way, the heat supply is in proportion to heat loss from the building and is not dependent on the temperature in any particular room. The manufacturer states that this type of control provides better temperature regulation with reduced fuel cost because it is completely automatic, supplying heat only when needed and controlling the heating system throughout the entire heating season. It is designed for installation in either new or existing buildings and will control any type of heating system.



Device for controlling heating system in accordance with outdoor temperature.



Simple, portable device for making comparisons between the color of a commodity and a standard color.

Color Comparing Device

A SIMPLE DEVICE for the comparing of food product colors to a standard has been brought out by Graphic Arts Research Corporation, 420 Lexington Ave., New York, under the name of the "Comparascope". The instrument is designed primarily to provide standardized conditions under which visual color comparisons can be made. It consists of a 10-in. diameter hollow sphere lighted on the interior and coated with reflecting material to provide a uniform, standardized illumination with absence of shadow.

The eye-piece at the top of the sphere is so located that the specimens and the standard, placed at the bottom of the sphere, appear as exactly equal areas, uniformly illuminated, viewed from the same angle. Another feature is claimed to be the fact that the standard and the specimen appear to have the same finish, no matter if the finishes are actually different, because of the use of a "disintegrating sphere" as a source of illumination.

The standard and the specimen to be compared for color are placed in position, side by side, on a $2\frac{1}{4}$ in. diameter horizontal stage, so arranged as to cover a center opening of like dimensions at the lowest point of the sphere's vertical axis. This stage surface is equally divided so that one-half accommodates the specimen and the other the standard and it can be raised into viewing position or lowered to receive or discharge samples other than liquids, as desired. Two metal cups are provided for use on this viewing stage when it is desired to hold powdered or granular materials for comparison.

Suitable correction and density filters used to simulate various sources of light, together with attachment for holding various color standards, are provided with the instrument. Also, a removable sphere cap, the inside surface of which is coated with some suitable color, is provided to control the reflection of the light on the field, so that colored samples, particularly the darker tones, can be made to appear more nearly in their natural brightness, thus making comparisons more realistic.

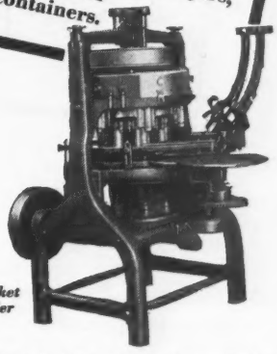
The instrument is of 6 lb. weight, has a base area of 12x14 in. and is 18 in. high. It is completely portable and can be plugged into any convenient lighting socket. The manufacturers say that it can be used for comparison purposes right at the point of operation as, for instance, in comparison of material on an inspection belt with a standard placed in the machine.

Hammer Mill

FOR GRINDING all sorts of grains and cereal products, Allis-Chalmers Mfg. Co., Milwaukee, Wis., has brought out a new type of vertical hammer mill designed to give nearly 100 percent screen area. This mill also uses a new type of hammer. It is said to give a large capacity per horsepower and cool grind-

YOU PREPARE IT... WE'LL FILL IT!

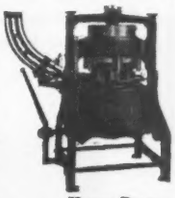
The Sky's the Limit! No matter what the nature of your food products —pulps, liquids, pastes, soups, potted meats, syrups, etc., etc. — there are FMC Fillers designed to fill them *at top speed* with unerring precision into any size or shape jars, cans, bottles or other containers.



M & S 6-Pocket Plunger Filler

• This M & S 6-Pocket Plunger Filler, for example, is an extremely versatile machine that handles any liquid or semi-liquid product and fills any size or shape container.

The Heavy Duty Plunger Filler, below, is a positive measuring, plunger type machine built to meet the needs of year 'round canners. Easily adjustable for various size containers, this machine will operate continuously for from 20 to 24 hours a day without interruption.



Heavy Duty Plunger Filler

NO SPOILAGE OR WASTE

Unless a container is in position under the nozzle, none of the product will be released.

SPEED

These 6-Pocket Fillers will fill up to 125 average size containers a minute. Other FMC Fillers are available with capacities up to 250 or more containers per minute.

Mail the coupon Now for information on the complete line of FMC Fillers!

FOOD MACHINERY CORPORATION F-601-FI
(Sprague-Sells Division) Hoopeston, Illinois

Please send complete information on Fillers contained in your New 1941 Catalog.

Product to be handled_____
Sizes and kinds of containers_____
Speed required_____
Name_____
Company_____
Street_____
City_____ State_____

3 WAYS TO PROFIT . . . . . .

√ **AVOID** Excessive Heating and Cooling Costs.

√ **SAFEGUARD** Against Spoilage in Processing.

√ **INSURE** Consistent Quality for Your Products.

MOTOCO Indicating Thermometers have rigid stem for direct mounting or capillary tubing for remote reading. Priced from

$20.

MOTOCO Recording Thermometers are priced from

$31.

It's wasteful to guess in food processing . . . and unnecessary when MOTOCO Thermometers cost so little. They should be installed at every point in the food plant where temperature is a factor.

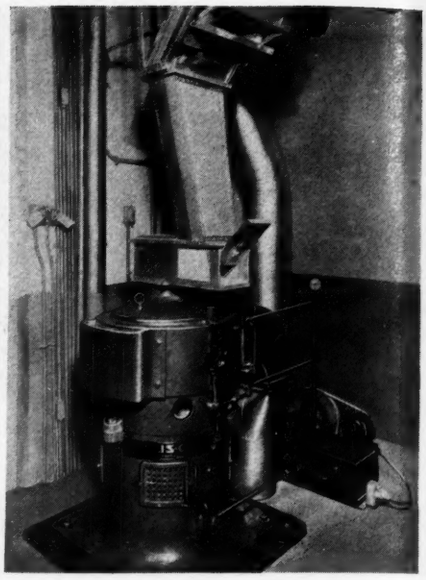
MOTOCO temperature indication helps to avoid excessive heating and cooling costs . . . safeguards against spoilage . . . serves to prevent production tie-ups from temperature variations.

MOTOCO Indicating Thermometers have easily read, evenly calibrated dials—the indicating head may be mounted where observation is most convenient, at some distance, if necessary, from where the temperature is taken. MOTOCO Thermometers are strongly made, give accurate service; they have solid liquid filled movement, and have no gears, pinions or delicate hair springs to get out of order.

Write today for our free illustrated folder showing models and sizes. Moto Meter Gauge & Equipment Division, The Electric Auto-Lite Company, Chrysler Bldg., New York, N. Y.

MOTOCO

INDUSTRIAL THERMOMETERS



Vertical hammer mill for grinding cereal products.

ing. It is available in motor sizes from 25 to 150 hp., with the motor mounted beneath the machine where it is away from the product being ground in order to reduce the fire hazard.

The machine is of compact design, requiring scarcely more floor space than a barrel. The main shaft is mounted on anti-friction bearings, lubricated by a small self-contained motor-driven oil pump. The product is drawn through the screen by means of a separate motor-driven fan discharging into a conical metal dust collector.

Colloid Mill

A COLLOID MILL with triple processing action has been brought out by The C. O. Bartlett & Snow Co., Cleveland, Ohio. Advantages of the new mill are stated to be: high rotor speed; easy feed and discharge of material; easy disassembly for cleaning, and easy reassembly; and absence of packing and glands, which promotes cleanliness. Also, because of its design, the mill is said to have a low horsepower requirement per gallon of material processed.

This machine is of the vertical type with material fed downward into a receiving hopper marked *A* on the accompanying diagram. Material then encounters the impeller vane *B* on top of the rotor, which travels at a speed of 10,800 r.p.m. It is forced through the periphery of the rotor at pressures as high as 150 lb. per sq. in.

At *C* the material is sheared in passing downward between the side of the rotor and the housing. This is the first processing action. The material is then impelled against centrifugal force by the

pressure of on-coming material, through a labyrinth of tight fitting circular rings *D*, on the bottom of the rotor and the top of the stator. This is the second processing action. Finally, the material is forced across the smooth section *E* between the rotor and the stator making the third processing action. The material then drains from the chamber *F* through the side discharge outlet without having come into contact with any packing or gland at any time.

The labyrinth *D* is usually formed of plain rings machined on the bottom of the rotor and the top of the stator, but all or any of these rings may be cut clockwise or counter-clockwise, with slots of various widths and spacing when additional cutting action is desired. Clearance between the stator and the rotor can be

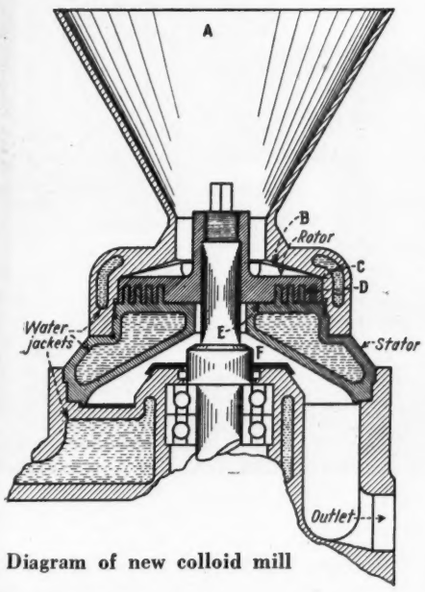


Diagram of new colloid mill

adjusted easily to meet various milling requirements and the assembly then can be locked at the desired adjustment.

Rotor, stator and inlet chambers of standard machines are of bronze. The inlet funnel or hopper is of stainless steel, and the housing is semi-steel. However, machines can be furnished in special metals or alloys to meet particularly processing requirements. Jackets can also be provided in the stator and housing for heating or cooling.

These colloid mills are available in four sizes, with 4 in., 6 in., 9 in. and 12 in. diameter of rotor.

Corrosion Resistant Paint

A NEW GRADE of Koroseal paint, called "Koroplate", developed to protect metal surfaces from corrosion, is announced by the B. F. Goodrich Co., Akron, Ohio. The base of this paint is Koroseal, a synthetic material made from polyvinyl chloride. The paint is liquid at room temperatures and requires no heating before application. At ordinary temperatures it can be either brushed or sprayed on and can be thinned with either brush or spray thinners when necessary. It comes only in a semi-glossy black and must be used over a Koroseal primer coat.

It is claimed for this new paint that when thoroughly dry it is extremely resistant to action of the fumes and vapors from acids, alkalis or salts at room temperature or slightly above. It resists all acids except concentrated formic and acetic. It is not recommended for constant immersion in liquids.

Air-Powered Mixer

EASTERN ENGINEERING Co., 45 Fox St., New Haven, Conn., has brought out an air-powered mixing unit designed for clamping on the top edge of tanks or other containers.

Because of the air-power feature, this mixer can be used without danger in the presence of inflammable or explosive materials. Its air motor can be adjusted over a wide range of speed and is completely inclosed so that it can be used without damage from splashing. This mixer is designed for use in up to 100 gal. containers and operates at 2000 r.p.m. The impeller is of nickel-plated bronze, driven by a stainless steel shaft coupled to the motor through a nickel-plated tube.

Air-powered mixing unit.

PIONEER *in* PROTECTION

● The foodstuffs vital to the nation's health are perishable.

JAMISON - BUILT Cold Storage Doors protect these foodstuffs from deterioration.

In 1888 the first commercial cold storage door was JAMISON-BUILT. The pioneer is still the leader.

Every worthwhile door improvement has been JAMISON-PIONEERED. Others have copied —none have improved.

Today you cannot buy a better cold storage door than a JAMISON —AND they cost no more!

Consult nearest branch or address JAMISON COLD STORAGE DOOR CO., Hagerstown, Maryland.

Jamison, Stevenson and Victor Doors

Jamison Standard Window Door. See Bulletin 122.

JAMISON-BUILT COLD STORAGE DOORS

NEW STAINLESS TANK TRUCK

keeps milk clean and of uniform consistency

NEW STREAMLINED MILK TRUCK *built with interior tank of U·S·S Stainless Steel. It is cleaner, weighs less and costs less to operate.*

THIS new 2000 gallon tank truck is built with inside tank and agitators of stainless steel to keep the milk clean in transit. The agitators maintain uniform consistency, making it possible to draw the milk from the stainless transportation tank and deliver direct to the pasteurizers without use of standardizing tanks or dump tanks.

Stainless Steel was used to keep the milk free from contamination and to reduce the dead weight of the truck. Because of its great strength and high corrosion resistance, U·S·S Stainless Steel can be used in thinner sections to obtain substantial weight reductions.

Stainless tanks do their share to keep milk clean, but stainless coolers, stainless pasteurizers, storage tanks, and separators are equally important in maintaining sanitation. This equipment pays for itself through faster cleaning, longer life and freedom from deterioration.

Inspectors and visitors, both, get a better impression of your plant from this gleaming, lustrous metal which not only looks clean but is clean.

U·S·S STAINLESS STEEL

AMERICAN STEEL & WIRE COMPANY, *Cleveland, Chicago and New York*
CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
COLUMBIA STEEL COMPANY, *San Francisco*
NATIONAL TUBE COMPANY, *Pittsburgh*
Scully Steel Products Company, Chicago, *Warehouse Distributors* · United States Steel Export Company, New York

USS

UNITED STATES STEEL

Just off the Press

BOOKLETS · LITERATURE · BULLETINS

Food Plant Equipment

Air Conditioning
On the occasion of its 25th anniversary, a book showing illustrations of many different types of air conditioning installations entitled "25 Years of Air Conditioning—1915–1940" has been issued by Carrier Corporation, Syracuse, N. Y.

Air Conditioning Units
The construction and application of "Capillary" air conditioning units in breweries, bakeries, packing plants and other industrial installations, form the subject of a 24-page bulletin issued by Air & Refrigeration Corp., 11 West 42nd St., New York, N. Y.

Candy Wrapping Machine
Model LP-2, a machine for wrapping candy pops, at a rate of 100 per minute, is described in a recent bulletin of Package Machinery Co., Springfield, Mass.

Coffee Roasters
The use of Thermalo coffee roasting equipment for the production of Premier coffee in the plant of Francis H. Leggett & Co., is described in a recent bulletin issued by Jabez Burns & Sons, Inc., 11th Ave. & 43rd St., New York, N. Y.

Dryer
The Roto-Louvre dryer, a rotary direct-heated dryer, which can also be used for a cooler, for the processing of such food materials as cereals, sugars, fruits, starches, seeds and powders, is described in a 24-page illustrated catalog, No. 1911, published by Link-Belt Co., 307 N. Michigan Ave., Chicago, Ill.

Filter
The Swenson rotating leaf pressure filter, a high efficiency filter for producing clear filtrates, is briefly described with application information in illustrated bulletin F-102, issued by Swenson Evaporator Co., Harvey, Ill.

Filter Media
Specialized filter media for industrial filtration, of glass, wool, cotton, rubber and other materials, are described with specifications and samples in a recent bulletin of Filter Media Corp., Irvington, N. Y.

Production Line Scales
The use of the "Speedweigh" predetermined weight scale in weighing, packing, testing and checking operations, is illustrated in folder Form 1415-A of Toledo Scale Co., Toledo, Ohio.

Refrigeration Equipment
In an illustrated bulletin entitled "20 Years Centrifugal Refrigeration," the design, operation and use of centrifugal refrigeration equipment, particularly in food plants, is described by Carrier Corp., Syracuse, N. Y.

Separation Equipment
In illustrated bulletin No. 92-C, magnetic separators for use in the milling and allied industries are described by Stearns Magnetic Mfg. Co., Milwaukee, Wis.

Separating Equipment
The "Magneduct" a device for removing metal particles from food products flowing in pipe-lines, is described and illustrated in Bulletin 403, issued by Process Machinery Co., 950 Bryant St., San Francisco, Calif.

Water Cooling Equipment
A catalog entitled "Water Conservation Equipment" describing a line of mechanical draft cooling towers, atmospheric cooling towers, spray nozzle cooling systems and roof cooling systems for water has been issued by Water Cooling Corporation, 71 Nassau St., New York, N. Y.

Plant Supplies

Aluminum Ladders
In a 44-page illustrated catalog, many types of aluminum ladders for industrial plant use are described by Aluminum Ladder Co., Tarentum, Pa.

Bearings
"Oilite" oil-cushioned precision bronze bearings are listed with specifications in Catalog 0-3, published by Boston Gear Works, Inc., North Quincy, Mass.

Boilers
In Catalog No. HRT-11 various types of horizontal return tubular boilers for industrial applications are described, with specifications, by Combustion Engineering Co., 200 Madison Ave., New York City.

Boiler Equipment
Automatic continuous boiler blow-off equipment, together with accessories such as heat exchangers and flash tanks, form the subject of Bulletin No. 2391, an 8-page illustrated publication of the Permutit Co., 330 W. 42nd St., New York City.

Brushes
All sorts of brushes of the "Steelgript" type, for industrial purposes such as processing and cleaning, are illustrated and described in a recent 8-page bulletin issued by the Fuller Brush Co., 3581 Main St., Hartford, Conn.

Circuit Breakers
Outdoor oil circuit breakers, Class 250-OS-150 and 250-OS-230, are described in Catalog No. 3650, and subway type oil circuit breakers, Type MS-2, are described in Catalog 3940, both published by Roller-Smith Co., Bethlehem, Pa.

Compressors
Single, horizontal, 2- and 3-stage compressors are described respectively in Bulletins L-611-B11A and Bulletin L-611-B12B, published by Worthington Pump & Machinery Corp., Harrison, N. J.

Diesel Engines
A 40-page bulletin, illustrated in color, showing the method used in the manufacture of its diesel engines and other products, has been issued by Caterpillar Tractor Co., Peoria, Ill.

Diesel Engines
Typical installations of diesel engines for supplying power in refrigeration and cold storage work are illustrated and described in a recent folder printed by Caterpillar Tractor Co., Peoria, Ill.

Fans
Ventilating and cooling fans are among the fan equipment described and illustrated in Bulletin FU-41, issued by Wagner Electric Corp., 6400 Plymouth Ave., St. Louis, Mo.

Motors
Heavy duty d.c. motors of constant speed types are described in two bulletins: GEA-1542D, motors from 1 to 60 hp.; GEA-1868B, motors from 50 to 300 hp., issued by General Electric Co., Schenectady, N. Y.

Motor Starter
The new "Size 1" magnetic motor starter, specifically designed for use on machines, is described in Bulletin GEA-2964B, issued by General Electric Co., Schenectady, N. Y.

Motor Starting Equipment
Pushbutton stations for standard installation are described in Bulletin GEA-3469 and manual motor starting switches, Type CR-1061, are described in Bulletin GEA-2234C, both published by General Electric Co., Schenectady, N. Y.

Pumps
The "Electrifugal" pump, a pumping unit with motor mounted on the same frame, in sizes from 1 to 10 hp. for heads up to 160

ft. is described in an illustrated bulletin, B-6140, published by Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Sanitary Fittings
A complete line of sanitary fittings in stainless steel, Trialloy and nickel-plated bronze are described and illustrated, with specifications in a 42-page bulletin issued by Tri-Clover Machine Co., Kenosha, Wis.

Small Chain Drives
In Folder No. 1894, fractional horsepower silent chain drive for production equipment and control devices are presented by Link-Belt Co., 307 N. Michigan Ave., Chicago, Ill.

Control Equipment

Control Equipment
Application of control instruments of the indicating, recording and control types for pressure and temperature in the food industries, are described in Bulletin 242 of the Foxboro Co., Foxboro, Mass.

Control Equipment
"New-Matic" remote transmission for use with control systems for temperature, pressure, flow and level together with application information forms the subject of an illustrated catalog No. 9400, issued by Brown Instrument Co., Wayne and Roberts Aves., Philadelphia, Pa.

Flow Meter
The "Linameter", a area-type flow meter particularly adapted to the handling of viscous food liquids, is described in Publication 2100, issued by Cochrane Corporation, 17th St, and Allegheny Ave., Philadelphia.

Liquid Level Gages
Catalog 1015, covering liquid level gages and their application to all sorts of liquids under all conditions, has been issued by Bristol Co., Waterbury, Conn.

Packaging

Container Linings
"The Facts about Protective Drum Linings for Steel Containers," dealing with lacquer linings for containers for such products as shortenings, syrups and concentrates, is the title of bulletin published by Ault & Wiborg Corp., 75 Varick St., New York City.

Miscellaneous

Benzoate of Soda
A resume of Federal and State laws bearing on the use of benzoate of soda in food products has been issued in pamphlet form by Seydel Chemical Co., 225 Mercer St., Jersey City, N. J.

Cleaning and Softening
Sodium tetraphosphate under the name of "Quadrafos," marketed for industrial purposes such as the softening and treating of water and the washing of bottles, and its properties are described in 8-page Industrial Bulletin No. 64, issued by Rumford Chemicals Works, Rumford, R. I.

Laboratory Chemicals
Rare sugars, amino acids, laboratory reagents and biochemicals are listed with prices in a recent publication of Pfanstiehl Chemical Co., Waukegan, Ill.

Protective Coatings
Bitumastic enamels, coatings and paint for the protection of equipment and plant construction from corrosion and deterioration are discussed in a 20-page illustrated Bulletin No. 1040 published by Wailes Dove-Hermiston Corp., Westfield, N. J.

Shipping Methods
Applications of "Steelstrap" in the shipment of many products, including sugar, canned goods, nuts and others, are discussed in "Acme Process News," issue No. 2, published by Acme Steel Co., 2840 Archer Ave., Chicago.

Stainless Steel
The "Blue Sheet" has been issued, giving information on the fabrication of stainless steels for various types of processing equipment and other uses, by Allegheny-Ludlum Steel Corp., Pittsburgh, Pa.

Water Treatment
Hot process water softeners for the removal of hardness, silica, and other impurities from industrial process waters, are discussed in a 48-page illustrated catalog with application data, issued by Cochrane Corporation, 17th and Allegheny Aves., Philadelphia, Pa.

Can there ever be "TOO MUCH OF A GOOD THING?"

● That depends on what it is! If you're talking about Stainless Steel, Trialloy or Nickel-plated Bronze Sanitary Fittings and Pumps, we're sure you'll agree that "too much" is better than "not enough"...especially when you're short just *ONE* Stainless Steel Fitting...for it can "hold up" the whole job and cost you PLENTY!

That's why so many up-to-date executives say: "Order TRI-CLOVER"... because they know that TRI-CLOVER has the *only complete line* of Stainless Steel, Trialloy and Nickel-plated Bronze Sanitary Fittings and Pumps. A big stock is carried at all times.

Besides, TRI-CLOVER Engineers are constantly developing and perfecting new and exclusive pumps and fittings on special order. Because of their highly specialized knowledge and experience, they are able to design specifically to your requirements QUICKLY!

Try TRI-CLOVER "THE *Complete* LINE"

Don't be "held up" on your installation. Order TRI-CLOVER!

TRI-CLOVER MACHINE COMPANY
KENOSHA, WISCONSIN
Write for the name of your nearest jobber

PIONEER MANUFACTURERS OF STAINLESS STEEL FITTINGS AND PUMPS

Plant Without Laboratory

(*Continued from page 69*)

ment for rendering lard. This part of our plant has been idle for some time because the lard formerly produced became rancid so quickly and because it lacked the all important white color. I was very pleased to find an article in FOOD INDUSTRIES on the prevention of rancidity by the use of ascorbic acid. Just before I saw this article, we too had been considering the use of ascorbic acid as an antioxidant for our lard. Maybe the small packer isn't so far behind times after all.

Check Power Costs

Another big problem still before me is a thorough check-up that must be made on our power plant. At present we are practically in the dark in so far as power costs are concerned. How far a chemist should go into this end of the meat packing business would seem to me to depend partly upon how much engineering training he has had, and also how much natural ability he has with matters of this kind. Nevertheless, the power plant is a place where much waste can occur from inefficient operation. Weekly or bimonthly reports on the various costs of operating the power plant should be made to the packing plant owner so that he may see when the costs of producing the steam and power run too high.

There are many ways of determining how efficiently the boiler rooms are functioning. Some of these include a determination of the overall boiler and furnace efficiency, which is simply a ratio of the heat units actually present in the total amount of steam produced to the heat units available from the coal burned in producing all this steam. Fuel costs per 1,000 lb. of steam should also be figured. Weekly reports on this fuel cost will show if any changes made in the operation of the boiler rooms make for more efficient operation and will show how various grades of fuel compare.

As to the actual operation of the boilers, one very important point is to see that the temperature of the stack gases is kept as low as is consistent with the steam pressure at the boiler.

Clean boiler heating surfaces are also consistent with efficient operation. Heavily scaled boiler surfaces transfer heat very slowly, and as a result much heat is lost in the stack gases.

Another very important feature in efficient operation is the regulation of the air-coal mixture to the proper proportion in order to keep the fuel loss at a minimum. An automatic CO_2 analyzer is the best means to determine if the fuel is being burned efficiently. Ordinarily the CO_2 should run about 10 to 12 percent in the flue gases. Quite a large fuel loss occurs when the CO_2 percentage drops below 10. So you see, the power plant justly deserves quite a bit of attention to eliminate the unnecessary waste.

Of the other unfinished control problems, one is concerned with the determination of the salt content of our hams at various depths to see if a uniform cure has been secured. Another consists mainly of analyses that must be made to determine the nitrite and nitrate content of our finished hams. Much work can still be done on the various spices we use. Another important routine job, rather than a control problem, that seems to me should be done, is the analyzing of every shipment of salt that is received. I feel that we should know both the physical and chemical impurities it contains and how they may vary from shipment to shipment. Analysis will be made on our washing powder to see if we are using an economical one. Another job might include moisture determinations on shipments of sawdust to see that we are not purchasing too much water. And so it goes. A week seldom passes that new problems do not arise in our plant.

Can you **BUY** Ice at **$1.25*** per ton?

***LOW Cost of Making**

VILTER PAKICE

(Depends on local power costs)

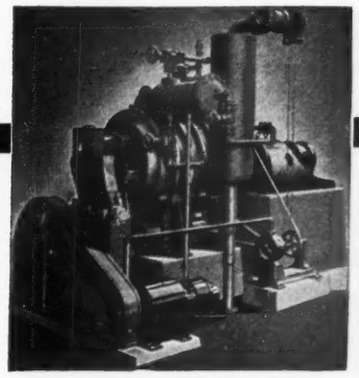
Vilter Crystalform Pakice—soft as snow—slow melting—easy handling—can be MADE in your own plant at costs as low as $1.25 per ton. How does this compare with your present Ice Costs?

Vilter Pakice Equipment often pays for itself during the first two or three years, through savings alone. Then all the other important advantages are EXTRAS . . . Better protection to perishables—time and labor savings—no crushing expense—savings in floor space. (Large 30-ton Pakice Machine requires floor space of only 8' 7" x 11' 9")

For Profits' sake, add the benefits of Vilter Pakice to YOUR Plant! Write today for latest bulletins.

• Vilter Pakice Equipment is available in daily capacities for all plant needs . . . in units of ½, 1, 2½, 5-tons and up to 30 tons in 5-ton increments. Briquette Attachment available on units from 15 tons and up.

Vilter 30-ton Pakice Machine with Briquette Attachment.



The Vilter Mfg. Co.
2115 S. First St.
Milwaukee, Wis.

Offices in Principal Cities

Superior Since 1867
VILTER
Refrigeration... Air Conditioning

Steel for the Food Products Industry

Ryerson Night Loading Assures Quicker Deliveries

IT'S after hours, at any of the ten Ryerson steel plants, almost any night of the year! The Ryerson night shift is putting the finishing touches on today's orders; loading out the fleet of big, red Ryerson trucks for tomorrow's deliveries.

The entire Ryerson organization is geared up to handle *quickly* the steel requirements, simple or involved, of thousands of customers the country over. Special telephone order desks, hourly mail pick-ups at the post office, telegraph and teletype lines right into our offices —all help to speed delivery, even *before* the order reaches us.

Night loading to "clear the decks" for tomorrow's new crop of orders is the regular course of business. Every order is RUSH at Ryerson—many are shipped the day received.

Ryerson Certified quality is your assurance of uniformity and exactness. Make the Ryerson Stock List your unfailing source for all steel requirements. If you haven't the latest Stock List we'll send one gladly.

Joseph T. Ryerson & Son, Inc., Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

RYERSON CERTIFIED STEELS

RYERSON

Food Technology

NEW DISCOVERIES & INVENTIONS

FOOD TECHNOLOGY

Activated Bauxite— New Color Adsorbent

THERMALLY ACTIVATED BAUXITE is superior to bone char in some respects as a solid adsorbent in refining sugar. Tests with "Porocel," a commercial activited filter bauxite, gave 3 to 10 percent increases in apparent purity of sirups, and up to 2 percent in high-purity liquors, when the defecated solutions were percolated through the bauxite. Invert content of solutions was decreased by 4 to 34 percent. Filtration through activated bauxite decreased ash content by 20 to 80 percent. By these tests bauxite surpasses bone char in ash adsorption, invert adsorption and purity of filtrates. It equals bone char in decolorizing effect. Granulated bauxite is softer than bone char, but in petroleum refining it withstands repeated handling and rougher treatment than it would receive in sugar refining. It imparts brilliant color (water white to amber, according to the original solution) to sugar sirups and solutions. As an inorganic product activated bauxite is easily and rapidly regenerated, after washing, by heating in presence of oxygen. Calcining in air at 700 to 900 deg. F. for 30 minutes is an effective regeneration procedure.

Digest from "Bauxite as a Sugar Refining Adsorbent," by W. A. La Lande, Jr., *Industrial and Engineering Chemistry* 33, 108, 1941.

BEVERAGES

Effect of Head Space In Bottled Wines

PORT, Burgundy, Tokay and sauterne wines were stored in bottles with normal head space, with none at all and with large head space (bottles three-quarters full). With a large volume of air in the bottle, port and burgundy suffered some loss in red color and a sediment was deposited in the bottles. Volatile acidity and aldehyde content increased while tannin content decreased. Esters remained about the same as before storage.

In Tokay and sauterne wines the large air space changed the color to a browner tint, with some loss in clarity and an increase in aldehydes, a slight loss in tannin content but scarcely any change in esters and volatile acidity. The tests were carried out at various storage temperatures, some in sunlight at room temperature and some in the dark at 60, 70 and 85 deg. F. The observed changes in color, clarity, flavor and sedimentation were in general unfavorable and are largely attributable to oxygen in the contained air.

Acting on this information, elimination of air from the head space in wine bottles was accomplished by filling the bottles with hot wine and sealing immediately so that a vacuum head space was formed on cooling. Wine bottled in this way kept well in storage.

Digest from "Keeping Quality of Bottled Wines: Effect of Head Space," by C. S. Pederson, H. E. Goresline, A. L. Curl and E. A. Beavens, *Industrial and Engineering Chemistry* 33, 304, 1941.

CANNED FOODS

Canning Tomato Juice

NUMEROUS SAMPLE PACKS of tomato juice have been prepared and tested to settle the much discussed question of whether or not process and filling temperature influence the odor, color and flavor of canned tomato juice. Practice varies widely in different canneries and sometimes even in the same cannery at different times. Tests were therefore made at the high and low extremes of process and filling temperature as actually practiced in the industry. Low filling temperature is generally from 147 to 155 deg. F. and high filling temperature from 170 to 200 deg. F. In the test pack the low process was 20 minutes at 212 deg. F., and the high process was 45 minutes at 212 deg. F.

Taste tests by various groups indicated that no significant difference could be detected as resulting from temperature differences in canning. Later tests included packs with still higher processes, *i. e.*, above the boiling point of water (225 and 235 deg. F.). While some tasters reported a slight flavor inferiority after 20 minutes at 212 deg. F. and 35 minutes at 235 deg. F. (the lowest and highest process in this series) the difference was too small to be commercially significant. It is therefore recommended that no spoilage risk should be taken for the sake of low filling temperatures or low process conditions since there is no appreciable improvement in juice quality to offset the risk.

Digest from "Effect of Process and Filling Temperature on Quality of Tomato Juice," by C. M. Merrill, read before the Canning Problems Conference, Chicago, Ill., Jan. 21, 1941, and released by the National Canners Association.

Canned Fruit Juices

EXTRACTORS for fruit juices still vary considerably according to the kind of fruit, but in general the trend is toward continuous automatic operation, whatever mechanical principle may be employed. For tomato juice the screw type extractor has almost entirely replaced the pulper type formerly used, and is much used also for pineapple and other juices. The newest extractor design is somewhat like a rotary air pump, with an eccentric shaft carrying radial fins and revolving inside the screen cylinder.

To avoid undesirable flavors in citrus fruit juices the extractor must be adjusted so that dextro-limonene from the peel oil does not get into the juice and so that naringin, a bitter glucoside contained in albedo and locular wall tissue, is also excluded. In extracting tomato juice it is essential to preserve the pectin so that the suspended solids will not separate from the liquid but will remain in suspension. Since the raw juice contains pectic enzymes these must be inactivated by heat before extraction so that they cannot destroy the pectin. Flash heating (45 seconds) at 176 deg. F. suffices to inactivate the unwanted enzymes. Tomato juice also demands a higher sterilization temperature than other juices because it contains relatively heat-resistant spore-forming anaerobic organisms.

Canned juices retain ascorbic acid

(vitamin C) better than do bottled juices, apparently because metal favors a reduced state in the juice. Citrus fruit juices are more sensitive to flavor changes in the can than many other fruit juices. Freeing the juice from oxygen is helpful but does not give complete flavor protection. Cold storage is also helpful but cannot ordinarily be maintained until the consumer is reached.

Digest from "Canning Fruit Juices: Technical Aspects," by R. H. Lueck and R. W. Pilcher, *Industrial and Engineering Chemistry* 33, 292, 1941.

DAIRY PRODUCTS

Frozen Cream

FROZEN CREAM is an important dairy item, there being from 20 to 30 million pounds in storage yearly at the end of the flush. It is used for ice cream and, to a lesser extent, for cream cheese. Cream, of 40 percent fat, freezes homogeneously without fat rise such as occurs in milk or cream below 25 percent.

On thawing, frozen cream oils-off considerably. This can be minimized by dissolving 10 percent sugar in the cream or by the addition of extra milk solids. Adding gelatine, sodium citrate or disodium phosphate, or homogenizing is of no use. Cream of 40 to 50 percent fat is used, pasteurized at 140 to 180 deg. F., from 0 to 20 percent sugar added, stored at zero to minus 20 deg. F. for periods up to 18 months.

Storage is in single-service tinned cans. Paper containers are harder to fill and handle. The cream is thawed by breaking into lumps and adding to the ice cream mix as it is heated. The use of frozen cream lengthens the whipping time necessary, but this can be decreased by adding sugar. The use of lecithin (as dried egg yolk, but not frozen) improves overrun, as does reducing the acidity of the mix with magnesium oxide to about 0.10 percent.

Some defects may appear in frozen cream on storage, the chief being tallowy flavor. To prevent this, higher temperatures (160 to 180 deg. F., which may give cooked flavor), higher fat (40 percent or over) and low storage temperatures (below zero deg. F.) are used. Copper contamination must be avoided, also increased acidity. Homogenization before freezing helps considerably in preventing tallowy flavor. Antioxidants, such as oat flour, are also effective.

Determination of the oxidation-reduction potential of the pasteurized cream before freezing may help in determining the keeping quality of the frozen cream. The tallowy flavor seems to be due to oxidation of the phospho-lipids (lecithin, etc.) on the surface of the fat globules.

Digest from "Frozen Cream; A Review," by Chester D. Dahle, *Journal of Dairy Science* 24, 245, 1941.

Bitter Flavor In Milk and Cream

ALL NORMAL RAW MILK contains a lipase, an enzyme which splits the fat to form acids giving a bitter flavor. As the percentage of fat in the milk or cream increases, the acidity thus developed in the serum increases up to 6 percent fat content. The acidity of the fat (determined by titration of the fat with alcoholic caustic soda) increases up to about 40 percent fat content. When measured as acidity per unit of fat, it shows a decrease when the fat content passes 8 percent.

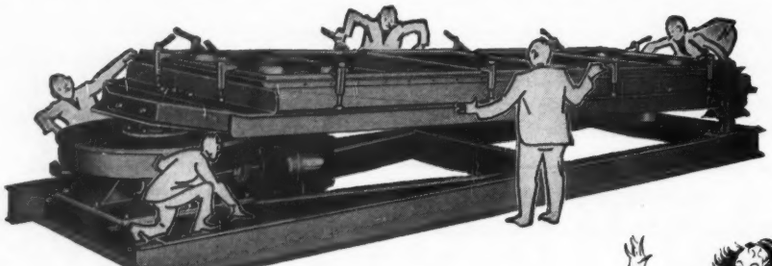
Butter oil separated from cream can be fractionally crystallized, different fractions separating out as it is cooled from 30 deg. C. down to 4 deg. The lower the crystallization temperature, the higher are the common fat constants—iodine number, saponification value, refractive index and Reichart-Meissl number. These butter oil fractions emulsified in skim milk develop acidity from lipase action which is greater in the lower temperature crystallized fractions and in all cases greater than for normal milk. Butter oil emulsified in skim milk shows an increasing acidity from lipase action as the temperature increases (up to 25 deg. C.) which is normal in an enzyme action. The opposite is true, however, of raw milk, in that raw milk which has been warmed to 30 deg. C. and then cooled below 15 deg. shows greater acidity from lipase at lower temperatures than at higher.

(This is probably one good reason against the practice of mixing warm morning's milk with cooled night's milk on the farm before delivering to the milk station—The Editors.)

Digest from "Effect of the Properties of the Fat and of the Fat Globule Surface on Lipolytic Activity in Milk," by V. N. Krukovsky and Paul F. Sharp, *Journal of Dairy Science* 23, 1109, 1940.

Fat Content of Cream Cheese

CREAM CHEESE made by the common cooked-curd method from creams varying from 8 to 22 percent in fat content showed that a fat range of 16 to 20 percent in the cream gave the best cheese. This fat yields cheese with 37 to 42 percent fat and 50 to 54 percent moisture. Lower fat creams give cheese of grainy texture and crumbly body, while higher fat creams produce cheese that is too



It's Got Everything She Has!

The versatile Gyro-Sifter bounces, shakes and gyrates all at once; but this vibration is confined to the sieves alone. The operating mechanism and bed are smooth and solid for quiet, continuous and trouble-free operation. . . . A wide range of sizes have been developed to handle everything from meat scraps to flour—each one giving maximum screening capacity with minimum floor space, and all fitted with ball bearings throughout for lower power consumption. . . . In other words, built to do a better job for less money. Fully illustrated catalog on request.

ROBINSON MANUFACTURING CO.
71 Painter St., MUNCY, PA.

smooth and sticky. With the fat content of the cream increasing from 8 to 22 percent, the yield of cheese per 100 lb. of cream increases from 15 to 55 lb., but the yield per pound of fat decreases from 2.96 to 2.18. The ratio of casein to fat in the cream is also important. This ratio in 12 percent cream made from 3 percent milk is about the same as in 14 percent cream. Cream cheese is also made by the "hot-pack" method by reheating drained curd with cream and stabilizers and homogenizing. This process yields a relatively low-fat cream cheese, the quality of which depends largely on the quality of the curd used.

Digest from "The Influence of Fat on the Quality, Composition and Yield of Cream Cheese," by Z. D. Roundy and W. V. Price, *Journal of Dairy Science* **24**, 235, 1941.

Bacteriophage—Trouble Maker In Cheese Manufacture

SUDDEN STOPPAGE of acid production, sometimes observed in experimental production of Cheddar cheese, has been traced to bacteriophage. Although a mixed organism was used as starter in the trial batches, the cessation of acid production was as abrupt as with a single strain starter. When composite milk samples from the same dairy herd were tested no phage could be detected. The mixed starter, air samples from the stable and from the laboratory and the rennet extract used in making the cheese were also tested but no phage was found.

Cheese from vats infected with this unidentified phage has inferior body and texture, with a distinct fruity flavor. Often the cheese maker blames the starter for slow or deficient acid formation when actually the source may be elsewhere. For example, the infection may be air-borne. The trouble is commoner in New Zealand than in Canada. In all probability the phage responsible for infection in the present instance came from the milk, a source which cannot now be identified. Wooden rakes and other equipment would carry the infection over. One cheese factory has reported that starter failures due to phage contamination were entirely eliminated by setting up a special starter room separate from the factory.

Digest of "Studies on Bacteriophage in Relation to Cheddar Cheesemaking," by C. K. Johns and H. Katznelson, *Canadian Journal of Research* **19C**, 49, 1941 (Published in Canada).

VITAMINS

Vitamin B_1 Content of Flour

THE VITAMIN B_1 (thiamin) content of whole wheat flour was determined in

A SAVING AT EVERY TURN

Reduce Floor Wear to a minimum.

Increase efficiency of employees.

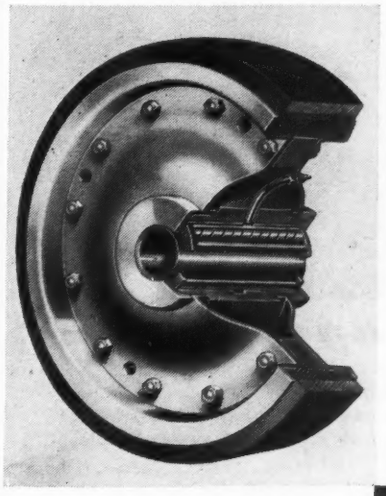
Eliminate wracking of equipment.

Save time, speed up production.

DARNELL DOUBLE BALL BEARING CASTERS

E-Z ROLL WHEELS

will pay for themselves many times over. Made in nearly 4000 types for every industrial use. Investigate today.



SEND FOR THIS NEW FREE BOOK

Darnell Corp. Ltd.
LONG BEACH, CALIFORNIA
36 N. CLINTON ST., CHICAGO
24 E. 22nd ST., NEW YORK CITY

46 samples by the fermentation method. This method is recommended for cereal laboratories as faster and less expensive than rat-feeding tests. The thiamin content of whole wheat flour as previously reported in the literature ranges from 4.7 to 10.2 gamma per gram. In these tests the average, calculated on the 10 percent moisture basis, was 6.85 gamma per gram, the minimum being 5.0 and the maximum 8.0 in the 46 samples. By comparison, in 18 samples of clear flours the thiamin content ranged from 2.0 to 4.7 gamma per gram.

There is a definite relation between ash content and thiamin content, more apparent in clear than in whole wheat flours. This correlation was observed in a variety of flours, including cake, standard patent and straight patent flours.

There was no correlation with ash content or special trend toward high or low thiamin content when the geographical sources of the wheats were considered, excepting that the white or softer type of wheat tended to run below average in respect to thiamin content.

Digest from "Thiamin Content of Whole Wheat and Clear Flours," by Chas. Hoffman, T. R. Schweitzer and Gaston Dalby, *Cereal Chemistry* **17**, 733, 1940.

MEATS

Why Zero Deg. F. Is Best For Pork in Frozen Storage

THE INFLUENCE of storage conditions (humidity and temperature) on color and rancidity was studied in pork cuts stored 48 weeks. Relative humidities of 83, 87, 96 and 100 percent were employed at 20, 10, 0 and −10 deg. F. Color was quantitatively measured both on the exposed surface and in the interior of the lean portion. Rancidity was determined in the fat.

At 20 deg. F. there was pronounced hemoglobin formation in the lean meat and there was some surface drying in all the tests. The principal factor affecting color is temperature, and frozen bacon must be kept down at least to 0 deg. F. to prevent color changes. Samples which changed most in color during frozen storage changed least in color after thawing.

Temperature was also the main factor influencing development of rancidity in the fat. Actual quantities of free fatty acid were small and not very significant but relatively the liberation of free acid with increasing temperature was significant, especially in passing from 10 to 20 deg. F. There was also a significant increase in peroxide oxygen at the higher storage temperature. To protect pork fat for about a year the temperature must be no higher than 0 deg. F.

Digest from "Effect of Temperature and Humidity on Color of Lean and Development of Rancidity in the Fat of Pork During Frozen Storage," by W. H. Cook and W. H. White, *Canadian Journal of Research* **19D**, 53, 1941 (Published in Canada).

MISCELLANEOUS

How Toxic is Arsenate of Lead?

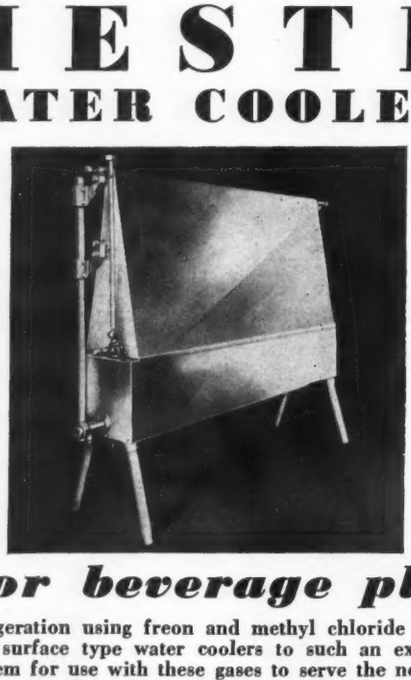
LEAD POISONING and arsenic poisoning have received vastly more attention separately than has been given to the toxic action of their combination as lead arsenate. Since lead arsenate is extensively used as an insecticide, especially in orchards, it is important to know exactly how much hazard it carries.

Toxicity tests have been made not only with lower forms of life (microorganisms and plants) but also with animals and man. The tests indicate that lead arsenate of the composition used in fruit sprays is definitely nontoxic to certain molds (*Mucor* and *Penicillium* species), yeast (*Saccharomyces cerevisiae*), algae (*Nostoc*) and bacteria (*Chlorella* species). Seed sprouting tests in germinators showed little or no toxic effect but some seeds (notably legumes, such as beans) were poisoned by lead arsenate mixed in the soil.

Doses of lead arsenate, beginning at 1 grain and increasing to 120 grains, were fed to a cow. Aside from an increase of about 15 percent in milk yield, there was no observable effect on the cow, and of 38 milk tests 31 showed no arsenic, two showed a trace and the highest amount of arsenic found in the other five tests was 0.002 grains per pound. A healthy man was given increasing doses of lead arsenate, starting at 0.0115 grain and rising to 1.15 grain. His total intake in 50 days was 30 grains. He experienced no ill effects, and careful clinical examination (including regular urine analysis and blood counts) revealed none of the characteristic symptoms either of lead poisoning or of arsenic poisoning. Whereas absence of arsenic in the milk seems to indicate that lead arsenate is not decomposed in the bovine gastrointestinal tract, it appears from urine analysis that such decomposition does occur in the human gastrointestinal tract.

Hypersensitivity of some individuals to lead or arsenic prevents drawing any general conclusion from this test, but it is significant that thousands of consumers

CHESTER
WATER COOLERS



. . for beverage plants

Electric refrigeration using freon and methyl chloride has widened the field for surface type water coolers to such an extent that we now make them for use with these gases to serve the needs of small as well as large bottlers. Furnished with or without covers. Made of tinned copper, aluminum or stainless steel.

Chester construction has been a standard of quality for the past 30 years in the Dairy Industry.

Write for full details.

CHESTER DAIRY SUPPLY COMPANY
9th & Hyatt Sts. Sanitary Heat Exchangers Chester, Pa.

ingest lead arsenate, often a much as 0.3 grain per day, from apples and pears without any evidence of ill effects. Similarly, a dairy herd of 50 to 60 cows has been fed dried pomace containing about 0.5 grain of lead arsenate per pound. None of the cows showed any symptom of poisoning, and the Butzeit test revealed no arsenic in their milk.

Digest from "How Toxic is Lead Arsenate?", by Ira D. Cardiff, *Journal of Industrial Hygiene* 22, 333, 1940.

Olive Products

OLIVES are naturally bitter because they contain an intensely bitter glucoside, oleuropein. One object of pickling is to hydrolyze this glucoside with dilute alkali, but since alkali also blanches the olives, the color must be restored by natural oxidation in a slightly alkaline medium. Usually, pickling is preceded by several months in a storage brine (5 to 9 percent salt), during which time lactic fermentation occurs and the texture becomes firmer.

Green-ripe olives, which are rapidly gaining in popularity, are not exposed to air for darkening of the color after the initial alkali treatment; they are greenish yellow to mottled gray. Spanish style green olives undergo six months to a year of lactic fermentation, barreled in heavy brine, with a little dextrose added if fermentation stops for lack of sugar. Greek style olives are tree-ripened till black, packed with about half their weight of rock salt in bins, shoveled over every two or three days, and finally screened from the salt, thinly coated with olive oil and packed for sale. They are very nutritious but retain some bitterness along with their saltiness and oiliness. The taste for them must be acquired, but they are popular among the Greeks and Italians in Eastern cities.

Spanish style green olives are sensitive to spoilage unless kept well on the acid side of neutrality (pH 4.2 or lower) during fermentation. Adding just the needed amount of dextrose imparts the required acidity because the dextrose is fermented to lactic acid. Bacterial spoilage, to which ripe olives are especially sensitive, can be avoided by pasteurizing at 160 to 180 deg. F.

Digest from "Olive Products," by W. V. Cruess, *Industrial and Engineering Chemistry* 33, 300, 1941.

Making Acids By Fermenting Glucose

KETOGLUCONIC ACIDS, which have several actual or potential uses in industry, can be made by fermenting glucose with *Acetobacter suboxydans*. The two principal products are 5-ketogluconic acid, formed in 90 percent yield in 33 hours by *Acetobacter suboxydans*, and 2-ketogluconic acid, formed in about 82 percent yield by a similar organism not yet fully identified. A commercially practical method for making dextrotartaric acid from 5-ketogluconic acid is available (U. S. Patent 2,197,021, 1940, to Pasternack and Brown). The acid can also be used to make a mixture of calcium salts in more soluble, and hence more assimilable, form than the calcium gluconate now used to add calcium to the diet. The calcium salt of 2-ketogluconic acid is readily converted, in good yield, to isovitamin C, useful as a scurvy preventive and also as an antioxidant in foods.

Fermentation of glucose to 2-ketogluconic acid proceeds rapidly either at 77 or at 86 deg. F. but the yield is slightly greater at 77 deg. F. The same is true of 5-ketogluconic acid. Trial fermentations were carried out in rotary-drum fermenters, but under some conditions a vat fermenter would be more desirable. It was found that fermentation could be effected quite successfully in aluminum-vat fermenters. There was no apparent advantage in fermenting at pressures higher than atmospheric. Glucose concentrations as high as 18.2 grams per 100 c.c. can be fermented, with excellent yield, but the process is slow, and lower concentrations (around 10 grams per 100 c.c.) give a better combination of speed and yield.

Digest from "Ketogluconic Acids From Glucose: Bacterial Production," by J. J. Stubbs, L. B. Lockwood, E. T. Roe, B. Tabenkin and G. E. Ward, *Industrial and Engineering Chemistry* 32, 1626, 1940.

Possibilities Of Gossypol Production

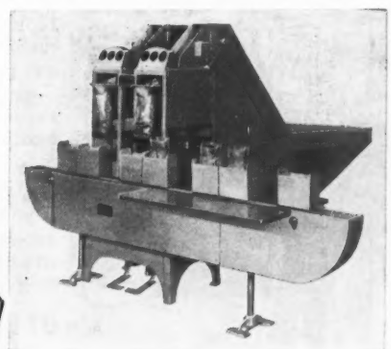
ONE ACRE of upland short staple cotton will yield 150 kilograms of dry root bark, from which about 1.4 kilograms of pure gossypol can be recovered by ether extraction. Gossypol content of the root bark increases with maturity and is highest in roots gathered in winter after the stalk has dried.

Digest from "Cotton-Root Bark as a Source of Gossypol," by Royce, Harrison and Hahn, *Oil and Soap* 18, 27, 1941.

Something New in Potatoes

THE CALORIC YIELD and carbohydrate content of potatoes are of about the same order as those of white or whole wheat bread, all calculated on the dry-matter basis. Potatoes are low in protein, but this is partially compensated by the fact that potato proteins rank

FREE



—Amazing New 3 Dimensional Film

showing the Triangle ELEC-TRI-PAK Vibratory Feed Weigher in operation will be sent to you on request for *10 days free use*—no expense, no obligation, return postage furnished.

Picture shows *in depth* how easily the ELEC-TRI-PAK operates and why unbelievable accuracies are assured. It describes in a series of pictures how 4 ELEC-TRI-PAKS in a prominent potato chip plant cut packaging costs in half . . . reduced floor space and produced better chips.

You'll enjoy this novel, entertaining picture and you'll have learned about one of the most outstanding weighers ever built. Send for your 3 dimensional film today.

TRIANGLE PACKAGE MACHINERY CO.

900 NO. SPAULDING AVENUE, CHICAGO

BRANCHES IN PRINCIPAL CENTERS

high in nutritional value. Common varieties of potato have about 2 to 3 percent protein, calculated on the whole tuber. In Europe, where firm texture is demanded, varities with somewhat higher protein content are in use. In vitamins, potatoes are relatively poor with the exception that they present a good and readily available source of vitamin C, and are about equivalent to bread in vitamin B_1.

In the matter of quality, the intended use is an important factor. For example, qualities which are excellent for boiling are likely to be unsatisfactory for frying, and the converse is also true. The white color commonly associated with potatoes is not an essential characteristic for there are deep-purple and beet-red varieties. These and other characteristics can be altered by selective plant breeding, so that potatoes with high starch content are being produced in Germany where alcohol is commonly made from potatoes. Varieties with as much as 25 percent starch (calculated on the whole fresh tuber) are already in cultivation, and varieties still richer in starch are said to be in prospect.

Digest from "Biology of the Potato," by R. N. Salaman; and "Nutritive Value of the Potato," by Harriette Chick, *Journal of the Society of Chemical Industry* (Chemistry and Industry) **59**, 735, 737, 1940 (Published in England).

Selenium in Soils and Foods

SELENIUM POISONING of grazing stock is a problem in certain areas of the West where alkali disease and blind staggers take a heavy toll.

Capacity to take up selenium from the soil varies widely in plants. Wheat from soil with a selenium content of 0.5 part per million (p.p.m.) accumulated only about 4 p.p.m., whereas certain wild plants which are used for testing seleniferous soils will accumulate as much as 4,000 to 5,000 p.p.m. from soils with no more selenium than 2.5 p.p.m. Wheat samples from elevators in Montana sometimes contained as much as 1 p.p.m., but generally less. While toxic wheat might conceivably be raised in some scattered areas it would be so diluted with nontoxic wheat in the grain elevators that there is no hazard. There are some highly seleniferous soils in Hawaii and Puerto Rico, but apparently their selenium is in a form not readily absorbed by plants.

Among food plants it was found that radishes, peas, lettuce, spinach, beets and squash did not accumulate selenium in toxic quantities even when raised in a highly seleniferous soil. Surveys which have been conducted by the Bureau of Plant Industry indicate that seleniferous soils do not constitute a food problem excepting that they have local significance in isolated areas.

Digest from "Selenium Occurrence in Certain Soils in the U. S. With a Discussion of Related Topics," by K. T. Williams, H. W. Lakin and H. G. Byers, *Technical Bulletin No.* 702, U. S. Department of Agriculture; printed by the Superintendent of Documents, Washington, D. C., price 10 cents.

Rat Lures

AS A RESULT of this investigation it would seem that the value of certain substances for rat lures lies in their attractiveness for the human purchaser rather than their attraction for rats. Substances tested were monosodium glutamate; oil of rhodium (imitation); extract of cheese (imitation); oils of anise, caraway, cinnamon, and peppermint; brewers yeast powder; two by-products of the manufacture of thiamin from rice hulls; thiamin chloride. They possess no merit as attractants for albino rats.

Digest from "Rat Lures," by Lubitz, Fellers and Levine. *Soap and Sanitary Chemicals*, February, 1941. Also Contribution No. 390, Massachusetts Agricultural Experiment Station, Amherst, Mass.

"The Best COSTS LESS"
According to Lipman Owners!
The difference in cost between the best refrigerating equipment and the least expensive amounts to practically nothing when compared with the value of the products which it must protect. For nearly thirty years Lipman Automatic Refrigeration has been safeguarding products and processes, in thousands of retail and wholesale establishments, and in a wide variety of manufacturing and processing plants.
Lipman low cost, trouble-free operation has won the hearty endorsement of owners, everywhere . . . has prompted them to specify Lipman Refrigeration as additional equipment was needed to expand their facilities. The reliability which is built into Lipman equipment means more to them than the possibility of a slight saving in the purchase price.
If you, too, measure costs in terms of long-lived dependability, freedom from repairs and delay, and adequate protection against spoilage, be sure to get the complete Lipman story. Write today!
COSTS
GENERAL REFRIGERATION DIVISION
YATES-AMERICAN MACHINE CO.
Dept. FI 541 Beloit, Wis.
Every Lipman installation is carefully planned and engineered to fulfill its particular requirements.
GR
AIR CONDITIONING
AMMONIA
METHYL-CHLORIDE
FREON
Lipman
AUTOMATIC REFRIGERATION

Boiler Water Conditioning

(Continued from page 73)

embellished with a high sounding trade name. The labels held forth great promises and fantastic claims, but failed to reveal the chemical nature of the product. This was the secret formula of the manufacturer and could not be divulged. Actually, almost everything one could think of was included in one or more of these compounds. Some were straight inorganic chemicals, such as soda ash, sodium silicate and caustic soda. Others used organic materials, such as tannin or alginate made from seawood, gums, kerosene and castor oil; each formed the basis of some devil's brew. Is it any wonder that food products men still shudder when they think of adding anything to the boiler water?

These compounds were sold generally without consideration of the analysis of the water to be treated and administered without chemical control. Some of the materials enumerated actually have a definite value and are in use today. When by chance the material furnished actually fitted the job, the compound worked. If it didn't, further trials were made in the hope of finding one which would.

The essential difference between water conditioning and the use of boiler compounds is that the former is the scientific administration of chemicals with due respect to all factors involved, while the latter is a haphazard process of guess and hope without even knowing what is going into the boiler.

In this respect a word of advice is given in the A.S.M.E. Code Combined Edition 1931, Section VII, Rules for the Care of Power Boilers, paragraph C-27: "It is not advisable to experiment with homemade treatments or boiler compounds"; again under Boiler Compounds, paragraph C-215: "No materials should be used for the prevention of scale, corrosion, and wet steam without an exact understanding of their composition, the nature of the objectionable materials in the feed water to be removed, and the influence the resulting products and unnecessary substances in such materials may have in causing unsatisfactory operating conditions."

Importance of Boiler Water Conditioning

Even sad experiences with boiler compounds are not sufficient grounds to exclude water conditioning. It is seldom, if ever, that a natural water will fulfill all the requirements of a boiler water. Soft water alone is not the answer to the problem because, as soon as evaporation takes place, concentration occurs. Boiler water conditioning is more than water softening. It implies, besides good feedwater, the careful maintenance of a certain state within the boiler at all times if scale, carry-over, corrosion and cracking are to be eliminated. Carry-over, which we are trying to avoid, will actually be less from a well-controlled boiler than from one which is left alone.

It seems hardly necessary to point out the losses which occur when conditioning is neglected. Deposits of scale form continuous insulating layers on the surfaces, causing higher stack temperatures and resultant waste of fuel. Scale forms first on surfaces subjected to the greatest heat input and unless mechanically removed will bring about tube failure. Repairs and outages are expensive, and mechanical cleaning is also costly.

High concentrations increase the carry-over and the tendency to foam and to prime, thereby threatening the quality of the product we are trying to protect. Severe priming may also cause damage to expensive equipment, while blow down means dollars into the sewer.

Corrosion and cracking or embrittlement endanger the life of the boiler and may result in condemnation or expensive repairs, providing you are lucky enough to have an inspector detect the fault before an explosion occurs.

Part II of this article, discussing various methods of internal and external treatment for boiler water, will be published in FOOD INDUSTRIES *next month.*

Letter to the Editor

British Put Vitamins into Margarine 15 Years Ago

To the Editor of FOOD INDUSTRIES:

We received recently our copy of FOOD INDUSTRIES for December, 1940, and as usual found the contents of great interest. However, in the article "Britain Fortifies its Food," we note on page 38, last column, some remarks in connection with margarine which are not correct and probably rest on a misunderstanding.

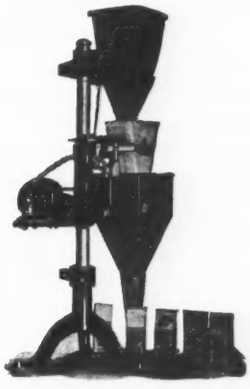
We are anxious that your journal should, as usual, contain accurate statements and therefore take the liberty of drawing your attention to the remarks about vitaminization of margarine. From these it is inferred that the war caused the introduction of vitamin margarine; in fact, the manufacture of this quality commenced about 15 years ago when this company began to market several brands of vitaminized margarine claimed and proved to be equivalent in vitamins A and D to butter. The production of such margarine grew rapidly, and already several years before the war all brands marketed by this company and its associated companies (such as the well-known brands of "Stork," "Echo" and "Blue Band") were vitaminized. Certain other manufacturers vitaminized some of their brands before the war, but when the government assumed control of the margarine industry all manufacturers were required to vitaminize margarine for household use.

Today all manufacturers market their margarine through Marcom Limited, and apart from a few specialties for manufacturing purposes there are two brands of household margarine of equal vitamin content but of different prices. They are "fortified" with vitamins A and D, which are the natural vitamins for such a product, and your reference to vitamin B in connection with margarine is probably due to a misprint.—A. ANDERSON, *Technical Direction Department, Lever Brothers & Unilever, Ltd., London, England.*

FOOD INDUSTRIES is grateful to Mr. Anderson for pointing out that Lever Brothers & Unilever, Ltd., had begun to vitaminize margarine about 15 years ago. The statement that vitamin B was added to margarine is an unfortunate typographical error.—THE EDITOR.

Automatic Packaging

W E I G H E R S



There is an Edtbauer-Duplex or a Bar-Nun "Auto-Check" Packaging Weigher for practically every requirement, ranging from extremely small, fractional ounce packages up to 50 and 75 pound bags and cartons. Efficient speeds—long time, trouble-free operation—accurate weights—are the features that enable these sturdy, useful machines to pay their costs through the production economies they effect.

Let us know the materials to be weighed, the size and type of containers, and the volume required. We shall gladly recommend and quote without obligation.

Catalogs on Request

B. F. Gump Co

Established 1872

454 So. Clinton St. Chicago, Ill.

Books

$14,000,000,000 For Food

HOW AMERICA LIVES. By J. G. Furnas and the staff of the *Ladies Home Journal*. Published by Henry Holt Co., New York, 1941. 372 pages; 6¼x8¼ in.; cloth. Price, $3.

A compilation of the article series which has been running in the *Ladies Home Journal* for the past year, this book will be welcomed as a guide to how America lives in all income brackets in every part of the country. This is the report of a group of specialists from the *Journal* who interviewed typical American families from the Wilsons of Wilson Packing Co., Chicago, to the Braceys, negro sharecroppers in the state of Mississippi.

Largest single item of American family yearly spending as shown by the survey is food—$14 billion. The chapter How America Eats gives food allowances for families of every financial status, shows the increased interest in vitamin foods and otherwise indicates which way the wind blows in the matter of family food expenditure.

Facts on Food Brokers

1941 DIRECTORY NATIONAL FOOD BROKERS ASSOCIATION; Published by the Association; Secretary's Office, Indianapolis, Ind., 1941. 96 pages; 5¼x9¾ in.; paper. Free.

The 1941 directory brings up to date a complete list of leading food brokers in the U. S. and Canada, to be filed away for reference by both sellers and buyers of the industry. Numerals after each brokerage company listed indicate the lines or commodities sold, whether the broker employs a force of specialty salesmen, operates his own warehouse, merchandise trucks and sales and advertising trucks.

Symposium on Temperature

TEMPERATURE. ITS MEASUREMENT AND CONTROL IN SCIENCE AND INDUSTRY. A symposium. Published by Reinhold Publishing Corp., 330 West 42d St., New York, N. Y. 1941. 1330 pages; 6½x9¼ in.; cloth. Price, $11.

Between the covers of this book are the papers presented at the symposium on temperature held in 1939 under the auspices of American Institute of Physics. For those who wish to make a scientific study of temperature in all its aspects, from that in the human body to that in massive concrete structures, the volume contains a wealth of technical detail. For those interested merely in the practical temperature measurement and control in the food industries, only four of the 120 papers in the book are of direct interest. These include: "Temperature Measurements in Air Conditioning"; "Temperature: Its Measurement and Control in Refrigerator Cars"; "Temperature Measurement and Control in the Food Industry"; and "Elementary Theory of Automatic Temperature Regulation."

Data on Dietetic Values

NUTRITIONAL CHARTS. Published by H. J. Heinz Co., Pittsburgh, Pa., 1940. 35 pages; 9x12 in.; paper. Free to dietitians, biochemists and food chemists.

In its ninth edition, this booklet contains useful and interesting data on nutrition. It gives a chemical analysis of most common foods, with the emphasis on vitamins. Subjects treated include human nutritional requirements, food allergy, food poisoning, food fads and the latest developments in vitamin research.

Output of U. S. Factories

THE OUTPUT OF MANUFACTURING INDUSTRIES. By Solomon Fabricant. Published by National Bureau of Economic Research, Inc., 1819 Broadway, New York, N. Y. 685 pages; 6¼x9¼ in.; cloth. Price, $4.50.

With the United States becoming the arsenal and larder of the democracies, this statistical study of factory output comes at an appropriate time. The book comprises a comprehensive survey of industrial production in America from 1899 to 1937. The first chapters summarize the broad changes in factory output and interpret their significance to the national economy. Then follow indexes of output for all manufacturing, for 15 groups of related industries and for 140 individual industries.

One chapter is devoted to "foods" and another to "beverages." According to the data, the foods group in 1937 ranked fourth among all manufacturing groups in total value added to their products, being outranked by textiles, machinery and iron and steel products. The outstanding feature of the industrial pattern of food manufacturing is the slow rate of growth in the output of the staple flour and meat packing industries, the rapid growth in the output of canned milk and canned fruits and vegetables, and the 3,233 percent increase in the output of beverages between 1933 and 1937.

Between 1889 and 1937, the total manufacturing output in this country increased by 276 percent, an average increase of 3.5 percent a year. There has been an increase of about 120 percent in manufactured goods available per capita.

Required Truck Equipment

EQUIPMENT REQUIREMENTS FOR MOTOR VEHICLES. 1940 Edition. Published by National Highway Users Conference, National Press Building, Washington, D. C. 136 pages, 8½x11 in., paper. Price, $1.

Federal and state requirements in respect to the safety equipment for trucks are given. The 28 sections of the book cover everything from brakes to fire extinguishers, for the United States and for each of the 48 states and the District of Columbia.

U. S. Nutrition Needs

ARE WE WELL FED? By Hazel K. Stiebeling. Bureau of Home Economics. Miscellaneous Publication No. 430, U. S. Dept. of Agriculture, 1941. 28 pages; 8x10½ in.; paper. Price, 15 cents; for sale by Superintendent of Documents, Washington, D. C.

This survey of the nation's nutrition problem, showing the millions of people in the United States living on diets below the safety line, greatly clarifies the need for a nation-wide nutrition drive as part of the defense program. U.S. public health authorities believe that nutritional diseases constitute our greatest medical problem, not from the point of view of deaths but from the point of view of disability and economic loss.

Labor Law Criticized

WHAT THE BUSINESS MAN SHOULD KNOW OF THE LABOR LAW AND ITS ADMINISTRATION. By J. Raymond Tiffany and Benjamin Werne. Published by J. Raymond Tiffany, 28 West 44 St., New York, N. Y. 1940. 61 pages; 8½x5¼ in.; paper. Price, $0.50.

The authors, seeking to define the rights and responsibilities of management in relation to labor, attack the NLRB administration of the Wagner Act as inimical to industry and to the public. The antitrust law and Federal Trade Commission Act are reviewed to indicate how management should protect itself against unfair employee practices.

Evaluating the present management-labor deadlock, the authors see a need for a new labor relations law which would harmonize the constituent elements in our industrial and social order.

Measuring of Liquids

(*Continued from page 82*)

It may be permanent or temporary, and is of significance only in large tanks. In an actual case of a cylindrical steel tank 20 ft. in diameter filled to a height of 20 ft. with a liquid having a specific gravity of 0.9 at 60 deg. F., the distance between a punch mark on the top inside edge of the tank and a striking-plate vertically below at the bottom inside edge was 0.3 in. less than when the tank was empty. This decrease in the vertical height was presumably due to deformation of the sides of the tank, caused by the pressure of the liquid, and would lead to an underestimation of approximately 60 U. S. gal. in determining the volume of the contents from the height of the liquid and the assumed original diameter of the tank.

Some of the numerical data presented have been expressed to several significant figures but it should be pointed out that there is no justification for always employing such factors in their entirety. For example, in using Table II to calculate the capacity of a cylindrical tank, it is superfluous to retain the last two decimal places of the factor 3.14159 if the diameter D or the height H can be measured only to the nearest 0.01 ft. (about $\frac{1}{8}$ in.); the rounded-off factor 3.142 will likely have a greater accuracy than the measurements made. The same principle applies when calculating a weight of liquid from its computed volume in a case where the density may be known to only three significant figures and temperature corrections may have been ignored entirely.

In an upright cylindrical tank 10 ft. in diameter and containing a 10-ft. depth of liquid of specific gravity 0.926 at 60 deg. F., the computed weight of contents could be erroneous to the extents indicated:

a. 47 lb. if an error of $\frac{1}{8}$ in. is made in measuring the height of liquid.

b. 49 lb. if a specific gravity of 0.925 instead of 0.926 is used.

c. 18 lb. if an error of 1 deg. F. is made in measuring the temperature.

d. 45 lb. if a coefficient of volume change $K = 0.0005$ instead of a correct $K = 0.0004$ per deg. Fahrenheit is used in allowing for a 10 deg. F. temperature difference.

In the most unfavorable case where all of these relatively slight errors happen to be additive, the total discrepancy would be 159 lb., or 0.35 percent of the weight (45,400 lb.) of the contents of the tank. This example serves to indicate the extent to which proportionally larger or smaller errors may affect the estimation of quantities of liquid in bulk.

Patents

Fruit Juices Separated From Pulp Particles With Retention of Slimy Pomace Constituents on Filter Fabric Along With Cellulose Fibers—Herbert T. Leo, Clarence C. Taylor and John W. Lindsey, to Mutual Citrus Products Co., Inc., Anaheim, Calif., No. 2,235,028. March 18, 1941.

Irregular-shaped and Various-sized Food Portions Compressed Into Regular-shaped Containers and Frozen While Under Pressure of Refrigerated Plates—Robert P. Fletcher, Jr., Glencoe, Ill., to Booth Fisheries Corp., Chicago, Ill. No. 2,235,209. March 18, 1941.

Fresh Roasted Coffee Protected Against Deterioration by Cooling to Below 0 Deg. C. and Compressing Into a Compact Block-like Mass—John C. Donnelly, New York, N. Y. No. 2,235,315. March 18, 1941.

Eggs Cleaned Mechanically by Slight Abrasive Action of Wiping Loops on Rods in a Rotating Squirrel-cage Unit—James P. J. Manggaard, Tenino, Wash. No. 2,235,404. March 18, 1941.

Traveling-tray Bake Oven Equipped With Means for Heating Both Upper and Lower Portions of the Oven Through Which the Conveyor Flights Pass—John V. Cook, to Peterson Oven Co., Chicago, Ill. No. 2,235,476. March 18, 1941.

Cookies Made on Rotary Molding Machine Mechanically Equipped for Removal of Molded Cooky Blanks From Die Roll—Edward A. Weidenmiller, Chicago, Ill. No. 2,235,492. March 19, 1941.

Bread-wrapping Machine Equipped With an Adjustable End-fold Device to Accommodate Loaves of Various Sizes—Charles H. Petskeyes, Davenport, Ia., and Israel C. Gellman, Rock Island, Ill., to Gellman Manufacturing Co., Rock Island, Ill. No. 2,235,503. March 18, 1941.

Fat-free Milk Containing 6 Percent Total Solids Fermented to 1 Percent Lactic Acid Content, Mixed With Extra Fresh Bottom or Top Brewer's Yeast to 12 Percent Total-solids Content and Concentrated Under Vacuum to 36 Percent Total Solids—William P. M. Grelck, Baltimore, Md. No. 2,235,613. March 18, 1941.

Freshly Drawn Bottom or Top Brewer's Yeast Pasteurized at Albumen-coagulating Temperature Preparatory to Concentration Under Vacuum to Approximately 44 Percent Total Solids, and Packaging in Airtight Containers as Vitamin Supplementary Food—William P. M. Grelck, Baltimore, Md. No. 2,235,614. March 18, 1941.

Poultry Picked in Mechanical Unit Equipped With Rubber Fingers in Rotary Feather-removing Beater Drums—Eddy E. McMahan and Antoine Charlebois, Los Angeles, Calif. No. 2,235,619. March 19, 1941.

Tea Leaves Subjected to High Vacuum for Removal of Air Preliminary to Cold-water Extraction of Soluble Constituents Followed by Extraction of Volatile Constituents in Vapor of Boiling Water and Combining of Volatile Constituents With Cold Water Soluble Extracts—Frank R. Eldred, Mount Taber, and Ray N. Reed, Midvale, N. J. No. 2,235,700. March 18, 1941.

Citrus Fruit Cut in Half and Edges Slit to Permit Spreading as Pressure is Applied to Force Half Fruit Into Conical Retainer and Juice is Forced Out—Albert W. Gould, Loughman, Fla. No. 2,235,744. March 18, 1941.

Juice Extracted From Citrus Fruits by Suction Action of Rotating Elements Against Which Fruit Divisions Are Pressed—Albert W. Gould, Lougham, Fla. No. 2,235,745. March 18, 1941.

Oils Separated From Skins of Citrus Fruit at Substantially Same Time Juice is Expressed, With Skin Oil and Juice Being Kept Separate—Albert W. Gould, Loughman, Fla. No. 2,235,746. March 18, 1941.

Grain to be Air-dried Agitated in Contact With Heated Surfaces to Raise Vapor Pressure of Moisture Content Above That of Atmospheric Air Moving at Sufficient Velocity to Carry Grain in Suspension—William V. Hukill, Arlington, Va., to U. S. A. Public. No. 2,235,748. March 18, 1941.

Dried Yeast in Sugar Sirup Digested With Fresh Yeast and Papain, Insoluble Material Removed and Filtrate Concentrated to Sirup Consistency and a High Vitamin B_1 and B_2 Content—Nathan Minton Cregor, New York, N. Y., Frederick E. Timmer, Hasbrouck Heights, N. J., and Robert M. Allen, New York, N. Y., to Vegex, Inc., New York, N. Y. No. 2,235,827. March 25, 1941.

Coffee Extract Made by Forcing Water Through Column of Ground Roasted Coffee at Greater Than Atmospheric Pressure—Herman Heuser, Evanston, Ill. No. 2,236,059. March 25, 1941.

Traveling-tray Bake Oven Equipped With Indirect Heating Unit Located so That Air and Gases Brought Over It Into Baking Chamber Are Kept in Agitated State—John V. Cook, to Peterson Oven Co., Chicago, Ill. No. 2,236,085. March 25, 1941.

Food Material Shredded in Rotating Drum Fitted With Grid Arms Exerting Pressure Against Drum Cutting Surface Consisting of Strands of Permanently Bent Wires—Martin Quamma, San Diego, Calif., to Van Camp Sea Food Co., Inc., Terminal Island, Calif. No. 2,236,113. March 25, 1941.

Vinegar Made in Generating Unit Containing Purifying Tank Provided With Means For Recirculating Excess Liquid Fed to Purifying Tank—Charles H. Owens, Edgewater, N. J. No. 2,236,153. March 25, 1941.

Fruit and the Like Mechanically Fed to Cutting Machine by Pusher Disk Connecting Fruit-receiving Magazine With Cutting Unit—Eugene Robert Jagenburg, Douglaston, Long Island, N. Y. No. 2,236,176. March 25, 1941.

Canadian Patents

Canned Foods Heat-sterilized Under Continuous Pressure and Cooled in Separate Chamber Containing Liquid Under Pressure—Pierre Carvallo, Paris, France. No. 394,181. Jan. 21, 1941.

Liquids Sterilized During Passage Through Duct Between Energized Solenoid and an Iron Core to Expose the Liquid to a Magnetic Flux—Wm. R. Walkey, London, England. No. 394,230. Jan. 28, 1941.

Green Coffee Irradiated With Infra-red Rays, Roasted, Re-exposed to Infra-red Rays and Finally Irradiated With Ultra-violet Light—Daniel J. Kennedy, Vancouver, B. C. No. 394,379. Feb. 4, 1941.

Green Coffee of High Grade and Inferior Berries Blended and Irradiated With Ultra-violet Light in Atmosphere Containing Water Vapor—Daniel J. Kennedy, Vancouver, B. C. No. 394,380. Feb. 4, 1941.

Grain Stored in Pedestal-supported Silos Constucted as Pairs of Cones Joined at Their Bases—José Ragni, Buenos Aires, Argentina. No. 394,388. Feb. 4, 1941.

Sausage Casings Filled by Machine Equipped With Cylindrical Sausage-feed Chamber Having Wedge-shaped Vane to Force Sausages Through Outlets at Each End—Edward P. Wilson, to Lancashire Dynamo & Crypto, Ltd., London, England. No. 394,442. Feb. 4, 1941.

White Wheat Flour Given Mineral Enrichment Through Addition of Water-insoluble Phytate of Copper, Iron or Manganese—J. S. Andrews, L. H. Evans and L. J. Huber, to General Mills, Inc., Minneapolis, Minn. No. 394,546. Feb. 11, 1941.

Wheat Grinding Mill Made to Have Sliding Shaft Pass Through a Round Chamber Formed by Outlet at Bottom of Hopper—Howard M. Johnston, to Massey-Harris Co., Ltd. Toronto, Ont. No. 394,568. Feb. 11, 1941.

Macaroni Pastes Dried in Separate Compartments Extending Axially Through Rotating Drum Arranged for Passage of Air Current—Chas. Hummel, Niederuzwil, Switzerland, to Gebrüder. Bühler, Uzwil, Switzerland, No. 394,977. March 4, 1941.

Butter Churned by Centrifugal Action from Diluted Cream at Moderately Elevated Temperature—Peter A. van der Meulen, Highland Park, N. J., and David Levowitz, New Brunswick, N. J., to Research Corp., New York, N. Y. No. 395,011. March 4, 1941.

THIS TREND TO

Note to food manufacturers concerning purity:

Monsanto elemental phosphorus tests better than 99.9% pure, thus providing the purest phosphoric acid available. All Monsanto phosphates are made from this exceptionally pure phosphoric acid.

Monsanto Food-Grade Mineral Supplements

Mono Calcium Phosphate
Di Calcium Phosphate
Tri Calcium Phosphate
Sodium Phosphates (Di—Tri—Pyro)
Iron Phosphates
Iodized Calcium Phosphate
Special Phosphates

Other Monsanto Products for the Food Industry Include:

Vanillin Monsanto
Coumarin Monsanto
Ethavan
Methyl Salicylate Monsanto
Sodium Benzoate

In recent years many leaders of the food industry have been doing excellent research work in further study of both the health and sales values of mineralization—i.e. the fortification of staple foods with mineral supplements. In fact, a few far-sighted manufacturers are already marketing foods which have been fortified with both the vitamins *and* minerals considered essential to a balanced health diet.

As the nation's largest producer of elemental phosphorus—from which our phosphoric acid and food-grade phosphates are derived, Monsanto is in an excellent position to serve the food industry's growing needs for mineral supplements of exceptional purity. Samples are available and our technical staff is fully prepared to render assistance. Inquire: MONSANTO CHEMICAL COMPANY, Phosphate Division, St. Louis, U.S.A. District Offices: New York, Chicago, Boston, Detroit, Charlotte, Birmingham, Los Angeles, San Francisco, Montreal.

MONSANTO CHEMICALS
SERVING INDUSTRY...WHICH SERVES MANKIND

Formulas for Foods

FORMULA NO. 191

Tomato Soup

Tomato pulp, 1.05 sp. gr.	90 gal.
Onions, peeled and ground	10 lb.
Garlic, peeled and ground	2 oz.
Celery	2 lb.
Parsley	2 lb.
Butter	10 lb.
Cracker meal	24 lb.
Worcestershire sauce	36 oz.
Sodium bicarbonate (variable)	3 oz.
Salt	17 lb.
Sugar (sucrose)	33 lb.
White pepper, ground	3 oz.
Cayenne pepper	¼ oz.
Liquid spice infusion	1 gal.
2½ oz. cloves	in water to make 10 gal.
2½ oz. pimento	
12 oz. celery seed	
1/6 oz. bay leaves	
Yield	100 gal.

If finishing volume is less than 100 gal., add water to make up to 100 gal.

Formula from Lebouche Cheval.
Republication rights reserved

FORMULA NO. 192

Canned Smoked Black Cod

(Sablefish)

A New Product

Use fish that have been frozen. Thaw overnight in fresh running water. Split and trim; also remove the nape. Sides with skin attached are then brined for 75 to 90 minutes in cold 80-deg. Sal. brine. Place, skin side down, on wire screens to drain.

After 15 minutes of draining, place trays in smokehouse, previously heated to 120 deg. F. Smoke at 120 deg. F. for 6 hours with relative humidity of 21 or 25 percent. Use birch sawdust or juniper for smoking. If the latter, use the green twigs instead of other wood shavings to spread under the sawdust when laying the fire. When smoking is completed, remove the trays from smokehouse and stack in a retort for precooking.

The loss during smoking is between 8.5 and 9 percent at a relative humidity of 25 percent, but if the product is smoked at 120 deg. F. and a relative humidity of 21 percent, the loss is about 11 percent. To obtain a fairly firm consistency of the final product it is necessary to remove about 25 percent of the weight as moisture. If this removal is accomplished entirely by smoking, the product will be oversmoked from the standpoint of flavor, color and dryness. Precooking in the retort obviates this problem.

Precook the smoked fish in retort for 10 minutes at 225 or 230 deg. F. This will remove an additional 15 to 17 percent of the moisture, and also will permit picking off the fish as skin and boneless flakes for packing into containers.

Pack in ¼-lb., ½-lb. or 1-lb. oval, enameled (*C* enamel) cans.

Can Size	Exhaust	Process
¼ lb.	8-10 min. at 212° F.	60 min. at 240° F.
½ lb.	10-12 min. at 212° F.	80 min. at 240° F.
1 lb.	12 min. at 212° F.	90 min. at 240° F.

Formula from P. A. Sunderland, Pacific Fisheries Experimental Station, Prince Rupert, B. C., in Progress Reports, No. 46.

FORMULA NO. 193

Anniversary Chocolate Cake

Cake flour, finest quality	4 lb. 8 oz.
Salt	2 oz.
Soda	2 oz.
Cream of Tartar	2 oz.
Sugar, light brown	8 lb.
Shortening, at 70 deg. F.	2 lb.
Water	3 lb.

Sift together the flour, salt, soda and cream of tartar. Place them into machine bowl. Use a paddle and mix until smooth, or for about 3 minutes on low speed, followed by 2 minutes on second speed. Scrape sides of bowl frequently.

Chocolate liquor, melted 2 lb. 4 oz.

Melt chocolate in double boiler. Add it *slowly* to creamed mixture while mixing on low speed.

Whole Eggs	3 lb. 8 oz.
Water	1 lb. 4 oz.

Mix eggs and water together thoroughly. Stream these slowly into the above mixture during a 2-minute mixing period on slow speed. Scrape down bowl. Finish to a smooth batter by mixing 2 minutes longer on second speed.

Total weight of mix... 24 lb. 14 oz.

Baking Suggestions

Layer pans	Scaling	Baking time	Baking temperature
7x1½ in.	9 oz.	16 to 18 min.	365° F.
8x1½ in.	13 oz.	20 to 22 min.	365° F.
9x1½ in.	16 oz.	20 to 24 min.	365° F.

Grease pans with a mixture of 1 lb. of shortening creamed with 2 oz. of cocoa and 6 oz. of flour. Line pans with paper bottom liners. Allow cakes to cool in the pans. Do not dump while warm.

Best results are obtained when the temperature of the finished batter is between 70 and 75 deg. F. The shortening should be about 70 deg. F. Sift lumps from brown sugar before using.

Melt chocolate liquor over boiling water. *Do not* melt the chocolate over a direct flame or in the oven.

Finishing

Brush loose crumbs from sides of cake before icing. Use either Imperial Chocolate Icing (Formula 188) or Chocolate Fudge Icing (Formula 183).

Formula from General Foods Sales Co., Inc.

FORMULA NO. 194

Butter Nut Brownies

Whole eggs (70 to 75 deg. F.)	1 lb. 2 oz.
Sugar (granulated sucrose)	2 lb.
Salt	½ oz.
Vanilla extract	½ oz.

Beat for 15 minutes with a wire whip on high speed.

All-purpose vegetable shortening	1 lb.
Caramel base (See Formula 200)	2 lb.

Melt together the shortening and caramel base. Then add to preceeding (in the mixing bowl). Mix thoroughly on low speed. Then sift together and add the following:

Cake flour	1 lb. 14 oz.
Baking powder	¼ oz.
Add and mix thoroughly	
Chopped dates	10 oz.
Chopped pecans	10 oz.

Be sure to flour the dates thoroughly before chopping.

Spread entire batch evenly in a greased and flour-dusted standard bun pan (18 x 26 in.).

Bake lightly, 30 minutes at 350 deg. F. When cool, trim edges with knife and cut 4 rows lengthwise and 18 rows crosswise, giving 72 brownies, 4¼ x 1½ in.

Formula from Lever Brothers Co.

FORMULA NO. 195

Home Made Fudge Icing

The smoothness of this icing depends

You Can Now Buy

MELOJEL

(the Double-Refined Corn Starch)

for the Same Price as Ordinary Powdered Corn Starch!

- Every food manufacturer using Corn Starch can now obtain the many outstanding advantages of **MELOJEL** without paying a premium!
- **MELOJEL** offers controlled "jell," with exceptional stability; unvarying uniformity; unusual smoothness; and improved flavor, for MELOJEL is remarkably free from cereal taste. Moreover—unlike ordinary Corn Starch—it does not "cloud."
- **MELOJEL** is unsurpassed for Pie Fillings and Dessert Preparations; as a bodying agent for Salad Dressings; for Caramels and other confections; or in any food product in which starches are used.

FREE WORKING SAMPLE:

We shall be glad to send you a generous free working sample, or a trial 100-lb. bag on approval, if you will give us the full facts regarding the type of product in which you want to use it. With the facilities of our Laboratory and Food Kitchen, we are equipped to give you valuable information for using MELOJEL to your best advantage.

NATIONAL STARCH PRODUCTS INC.

818 GREENWICH STREET, NEW YORK

on mixing while warm. Have milk nearly boiling before adding it to sugar.

Sugar (sucrose) XXXXXX, sifted	5 lb.
Vanilla extract	¼ oz.
Salt	⅛ oz.
Fluid skim milk, scalded	1 lb. 4 oz.
Invert sirup	1 lb. 4 oz.

Heat milk carefully until nearly boiling. Then remove from fire. Stir the invert sirup into the hot milk, and add this solution to the 6X sugar-vanilla-salt mixture. Mix well.

Melt together at 110 to 120 deg. F.:

All-purpose vegetable shortening	14 oz.
Butter	4 oz.
Chocolate	2 lb.

Add gradually to icing and continue to stir until the icing thickens to the proper consistency.

Finished weight of mix	10 lb. 2 oz.

When using on next day, warm over a hot-water bath and mix until smooth.

NOTE: The invert sirup may be omitted if desired without changing any of the other ingredients, and without changing the method. Never reheat over an open flame.

Formula from Lever Brothers Co.

FORMULA NO. 196

Diabetic Bread

Soy flour, full fat	12 oz.
Gluten flour	3 lb.
Salt	1¼ oz.
Yeast	2 oz.
Water	Must be estimated

Directions

Dissolve soy flour in water with yeast and salt. Add the gluten flour and mix a soft dough. Keep in a warm place, and if dough doubles twice the size, punch the dough down. Then give the dough 20 to 30 minutes more. Scale and make into loaves. Give medium proof. Bake accordingly. Dough temperature, about 80 to 85 deg. F. Formula adjusted to Staley's No. 1 soy flour.

Formula from
A. E. Staley Manufacturing Co.

FORMULA NO. 197

Soy Bread

Water	24 lb.
Yeast	12 oz.
Sugar	12 oz.
Shortening (lard)	12 oz.
Salt	12 oz.
Yeast food	3 oz.
Milk, powdered	12 oz.
Flour, hard, white, northern patent	35 lb.
Soy flour, full fat	3 lb.

(*Turn to page* 128)

WILL YOUR PRODUCT TASTE THE SAME IN MAY AS IT DID IN NOVEMBER?

THAT there should be no variation in flavor is a thoroughly acceptable principle. Nearly all food manufacturers achieve it with varying degrees of success. But here is a simple, easily proved fact. Through the use of Essential Oils (Flavoring and Spice Oils) instead of natural ground spices, *uniformity of seasoning, flavor and quality are assured* . . . your foodstuffs taste the same in MAY as in NOVEMBER.

No "ersatz" product, M M & R Essential Spice Oils are distilled, under scientifically controlled conditions, from the natural spices. The use of M M & R Spice Oils is not only more practical but also more economical.

MORE PRACTICAL because with essential oils food products remains free of hard, gritty substances (spices). There is no introduction of mould or enzymes, and distribution of flavor throughout the product is even, and each batch uniformly and identically flavored.

MORE ECONOMICAL because it *costs less* to flavor with M M & R Essential Oils. Write today for our "Table of Equivalents" comparing the relative flavoring strength of Natural Spices with that of M M & R Essential Spice Oils. Our flavoring experts will be happy to tell you more about the advantages of using M M & R Spice Oils.

11 Reasons Why You Should Use Spice Oils

1. Uniformity of quality and flavoring
2. No color disturbance
3. Less bulk in storage
4. Less weight in shipping
5. No danger of moulding
6. No loss by exposure in package while being stored
7. No starch introduced into your mixture
8. Ease of handling
9. Less cost as compared with equivalent spice value
10. Entire flavor available immediately
11. Elimination of the possibility of dust and dirt

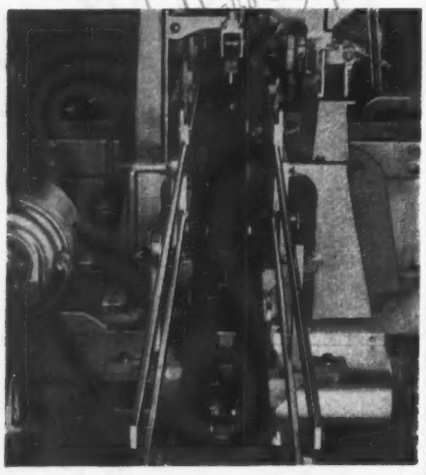
MAGNUS, MABEE & REYNARD, INC.

QUALITY ESSENTIAL OILS. CONCENTRATED FLAVORS . . . SINCE 1895

16 DESBROSSES ST. NEW YORK, N. Y.

CHICAGO: 221 N. La Salle St. LOS ANGELES: 747 Warehouse St. CANADA: Richardson Agencies, Ltd., Toronto

No Red Lights



ON THIS

WORLD HIGHWAY

There are no stops, no detours when glass containers enter the smooth, straight highway of the *WORLD Automatic BEE-LINE Straightaway Labeler.* Each individual package is smoothly and automatically timed, spaced and piloted gently but firmly through the complete operation. It's ideal for the new, light weight glass.

The WORLD BEE-LINE STRAIGHTAWAY applies front or front and back labels—neck labels, too,—to all kinds of glass containers.

Why not put your bottles on this high road to better labeling. For complete facts and figures send us a set of your labeled packages.

ECONOMIC MACHINERY CO.

WORCESTER, MASSACHUSETTS

Procedure is the same as for making white bread. Dough should be cool while working, about 78 deg. F. Total time, 2 hours 45 minutes. Baking temperature approximately the same as for white bread, 400 deg. F.

Shortening is reduced to about one-half that normally required for white bread to compensate for the high fat content of the soy flour. A shorter dough time does not affect the dough strength. but a smaller loaf will be produced. If the dough time is cut down the loaf will be more compact.

Yield, 50 loaves, 20 ounces each.

Formula adjusted to Staley's No. 1 soy flour.

Formula from
A. E. Staley Manufacturing Co.

FORMULA NO. 198

Raspberry Sirup

Raspberry juice	40 gal.
Strawberry red color (liquid)	16 oz.
Raspberry red color (liquid)	12 oz.
Benzoate of soda	½ lb. dissolved in 1 pt. of water
Corn sirup	2 gal.
Sugar	425 lb.
Raspberry true fruit extract	1 gal.
Yield	60 gal.

Mix the ingredients together cold. The mixing may be hastened by heating to 150 deg. F., but if this is done, the true fruit extract should be withheld until just before bottling. (For preparing the strawberry and raspberry red color, see Formula 168.)

The raspberry juice may be bought as such, or it may be obtained from other sources such as being centrifuged from heated, straight frozen, Cuthbert raspberries. In any case the Baumé should be checked because of variations in the juice.

Formula from David Algie.

FORMULA NO. 199

Vanilla Caramels

	Caramel No. 1 (Percent)	Caramel No. 2 (Percent)
Sweetened condensed whey		
Whey solids	26.2	22.0
Sugar	26.2	22.0
Condensed skim milk solids	7.0	9.0
Corn sirup	23.7	28.0
Invert sirup	6.3	6.3
Coconut fat	10.6	6.7
Butterfat	....	....
Total	100.0	100.0

Boil to 246 deg. F. Cool on stone slab.

Formula from B. H. Webb and C. F. Hufnagel, Bureau of Dairy Industry, U. S. Department of Agriculture, Washington, D. C.

PRODUCTS of Intrinsic Merit

with full flavor value, manufactured by "D & O" that are indispensable to the canning and allied industries

OIL DILL WEED
OIL CLOVE
OIL CASSIA
OIL PIMENTO
OLEO RESIN CAPSICUM

For prompt delivery or on contract

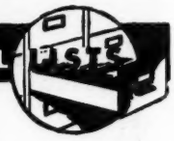
We solicit your orders

DODGE & OLCOTT COMPANY

180 Varick Street . New York, N. Y
Boston • Chicago • Philadelphia
St. Louis • Los Angeles
Plant and Laboratories—Bayonne, N. J.

D&O ESTABLISHED IN 1799

McGRAW-HILL DIRECT MAIL LISTS



As business paper publishers for over fifty years, McGraw-Hill is uniquely equipped to offer complete, authoritative direct mail coverage of Industry's major markets. Extreme accuracy is maintained (guaranteed to 98%) and through careful analysis of markets, complete classification of companies and personnel, etc., the widest possible selections are available. Send for handy reference folder, "Hundreds of Thousands of Reasons Why" which describes how McGraw-Hill Lists are built and maintained.

What Fields Do You Want to Reach?

Aviation
Bus & Electric Railways
Civil Engineering and Construction
Administrative Executives

Electrical Dealers & Wholesalers
Mill Supply Houses
Power Services
Product Engineering & Design
Production and Maintenance
Radio Dealers & Wholesalers
Radio Engineering & Design

For further details, selections from above basic classifications, counts, prices, etc., or estimates on special lists . . . ask any representative or write to

Complete Lists Covering Industry's Major Markets